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Bibliography on Radiation Bioclimatology

ol. 4 August, 1953 No. 8

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 4 AUGUST, 1953 No. 8

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Radiation Bioclimatology

(*For complete table of contents see back cover*)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ing to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains from 175 to 300 abstracts of current periodical literature and monographs in e fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged cording to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 im- rtant references on a special subject without respect to recency of material. No attempt made to prepare exhaustive bibliographies; instead, the aim is to include a representative oss section of the various aspects of a subject. Preference is given to recent material, mprehensive works, material from obscure sources, and items with good bibliographies.

Bibliographies previously published were:

o. Mo.	Vol. I, 1950	Vol. II, 1951	Vol. III, 1952
. Jan.	**Atmospheric Pollution**	**Extended Forecasting**	**Climate—Northwest Africa**
. Feb.	**Aerobiology**	**Long Range Forecasting**	**Carbon Dioxide**
. March	**Cloud Physics**	**Soil Temperature**	**Climate—Argentina, etc.**
. April	**Hail**	**Constants, Tables, etc.**	**Dew**
. May	**Tornadoes**	**Climate—Near East**	**Objective Forecasting**
. June	**Volcanic Dust**	**Climate—Middle East**	**Stratus Forecasting**
. July	**Climatic Changes**	**Special Winds**	**Urban Climatology**
. Aug.	**Thunderstorms**	**Radar Storm Detection**	**Climate—Central Africa**
. Sept.	**Icing**	**Condensation Trails**	**Visibility**
. Oct.	**Acoustical Propagation**	**Climate—Northeast Africa**	**Glaze and Rime**
. Nov.	**Evaporation**	**Mountain Meteorology**	**Free Air Turbulence**

Bibliographies published this year are:

1. **Turbulence Theory,** Vol. IV, No. 1, Jan. 1953
2. **Turbulent Diffusion and Exchange,** Vol. IV, No. 2, Feb. 1953
3. **Frost and Frost Forecasting,** Vol. IV, No. 3, March 1953
4. **Climate of Australia and New Zealand,** Vol. IV, No. 4, April 1953
5. **High Level Winds (500–100 mb),** Vol. IV, No. 5, May 1953
6. **High Level Winds (above 100 mb),** Vol. IV, No. 6, June 1953
7. **Jet Stream,** Vol. IV, No. 7, July 1953
8. **Radiation Bioclimatology,** Vol. IV, No. 8, Aug. 1953

Forthcoming bibliographies will be:

9. **Meteorology and Oceanography of the Pacific,** Vol. IV, No. 9, Sept. 1953
10. **Auroras,** Vol. IV, No. 10, Oct. 1953
11. **Sferics,** Vol. IV, No. 11, Nov. 1953

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Auroral Physics
Climate of Southeast Asia and the East Indies
Machine Methods in Meteorology
Microwave Propagation
Oceanographic Meteorology
Ozone
Radiation Data
Snow Cover
Tropical Cyclones
Tropopause Variations

Part III contains a listing of the contents of those journals which are primarily meteoro- gical. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue mulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where th material may be found. The Union List of Serials (Gregory) is the source of most of th symbols used. In some cases, where no symbol has been assigned to a library, one will b devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorologica Society) Library, Milton, Mass.
NN:	New York Public Library, New York, N. Y.
NNA:	American Geographical Society Library, New York, N. Y.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

COMPENDIUM ARTICLES AND WORKS OF SPECIAL INTEREST

4.8–1 551.58(02) 551.584(02)

*Alisov, B. P., Drozdov, O. A. and Rubinshteĭn, E. S., **Kurs klimatologii. Chast' I. bshchaia klimatologiia. Chast' II. Metody klimatologicheskoĭ obrabotki nabliudeniĭ.** Course in climatology. Pt. I. General climatology. Pt. II. Methods for climatological rocessing of observations.] Leningrad, Gidromet. Izdat., **1952.** 487 p. 162 figs., 134 tables, bliog. p. 478–482. **DLC**—This volume comprises the first two parts of an ambitious series texts to be used in teaching climatology in the universities or in-service training courses the government services. The point of view throughout the work is that of a trained eteorologist well versed in statistics and the physical sciences other than geography. The eatment of the climatic factors is entirely analytical and critical—only in the first chapter hich deals with the history of climatology are the contributions of Russian scientists em-hasized and those of other countries low-rated. After the author gets this off his chest e gets down to a really excellent treatment of the radiation from the sun, its effect on the tmosphere and the earth, the heat balance and atmospheric structure. Chap. II deals ith the influences of oceans and continents on the climate (including influence of currents) nd on plants or plant growth. Chap. III is devoted to the effect of the general and local rculation factors on climate (including air mass, frontal or synoptic climatology). Chap. IV evotes a few pages to climatic zones and types, and a few more to climatic classification from UPAN to KÖPPEN and including various schemes of DOKUCHAEV, BERG, VOEĬKOV, L'VOVICH, AMINSKIĬ, BUDYKO and ALISOV but no mention is made of THORNTHWAITE's system. Chap. is entitled "Influence of relief on climate and on the separate elements" (pressure, com-osition of air, circulation, radiation, soil and air temperatures, humidity, precipitation, ow cover and vegetation). Chap. VI is an excellent 80 page treatment of microclimate ethods, heat and moisture balance, turbulent exchange, lapse rates in wind, temperature nd humidity, local relief; microclimate of crops, plant associations and bogs, forests, lakes, vers, sea coasts, cities and towns) with many examples and illustrative figures or tables om Russian material. Chap. VII deals with climatic change, reviewing all the standard ypotheses and a number of Russian (e.g., BERG's) theories on this subject. The work of UBINSHTEĬN (1946) and others on the warming of the Arctic and of BELINSKIĬ (1946), ZAĬKOV nd others on the changes in the level of the Caspian Sea are particularly important. Chap. III goes into the effect of man (or woman) in changing the climate and the Stalin plan for ansforming nature. The second part of the book (p. 335–477) consists of two chapters on tatistical treatment of climatic or meteorological records. Chap. IX goes into the theory f smoothing or homogenizing records, and Chap. X to compiling temperature, pressure, umidity, precipitation, snow, wind, cloud, fog, soil temperature, thunderstorms, blizzards, icroclimatic, heat balance, aerological and synoptic "complex climatic classification" records, bibliography (95% Russian material) arranged by chapters, a subject index and 6 folded harts are appended. These are mean temperature of air at sea level (Jan. and July) air asses, fronts and isobars (KHROMOV) for Jan. July, annual precipitation (DROZDOV) and OPPEN's climatic zones, all for the earth. *Subject Headings:* 1. **Climatology 2. Micro-limatology 3. Textbooks.**—*M.R.*

4.8–2 551.551 533.17

†Batchelor, G. K., **The theory of homogeneous turbulence.** Cambridge, University ress, **1953.** 197 p. 29 figs., 171 refs., eq. **DWB**—In this book homogeneous turbulence, efined as a random motion whose average properties are independent of the position in the uid, is treated as a problem of applied mathematics or theoretical physics. After a historical

survey since G. I. TAYLOR (1935), the mathematical representation of the field of turbulen is set out in Chap. 2. Chap. 3, "Kinematics of homogeneous turbulence," includes the speci case of isotropy. In Chap. 4 problems involving linear relations are discussed, especially wind tunnels. Chap. 5 deals with the general dynamics of decay of turbulence. This includ the flow of energy (but not turbulent diffusion), permanence of big eddies and final period decay. Chap. 6 "The universal equilibrium theory" deals with statistical equilibriu energy spectrum, etc. In Chap. 7, on decay of turbulent energy, the experimental evidenc that turbulence soon settles down to a statistical state nearly independent of the initial cond tions leads to a "quasi-equilibrium hypothesis" and HEISENBERG's form of the energy spectrun Chap. 8 considers the joint probability distribution of tensor velocities at a number of point comparing theory with observation. The book is a richly documented summary of recer work on the physics of turbulence but has little direct meteorological interest. *Subject Headin* **1. Turbulence.**—*C.E.P.B.*

4.8–3 551.513:551.51

†Bolin, Bert (*Stockholm Univ.*), **Studies of the general circulation of the atmosphere** *Advances in Geophysics*, New York, 1:87–118, **1952.** 9 figs., 42 refs. **DLC**—A systemati review of the most recent ideas regarding the general circulation of the earth's atmosphere The mean motion and local, seasonal and transient variations therefrom, the radiation an momentum balance, horizontal vs. vertical exchange processes, the index cycle, are discusse as an introduction to a theory and model of the atmospheric circulation. The barotropi model, the baroclinic model and effects of topography on any model, are treated in the las chapter. The results of dishpan experiments on the one hand, and of laborious calculation of poleward flux of angular momentum from actual wind data, or from upper air pressur charts (mostly for Northern Hemisphere) are considered in the models which are presented *Subject Headings:* **1. Atmospheric circulation 2. Atmospheric models 3. Review article 4. Advances in geophysics.**—*M.R.*

4.8–4 551.594.7:621.39

Booker, H. G. (*Cornell Univ.*), **Meteorological aspects of propagation problems.** (In **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1290 1296. 3 figs., 20 refs., 5 eqs.) **MH-BH**—The phenomenon of superrefraction or extra down ward refraction in which the downward refraction of radio waves exceeds the curvature of th earth, as experienced at radar stations is described and the regions in which this phenomeno has been observed are listed. An explanation of the origin of superrefraction in terms of th temperature excess and of the humidity deficit of the appropriate air mass in relation to th earth's surface is presented. The problems of specifying accurately the temperature an humidity gradients and other meteorological data from generally available synoptic data an the meteorological factors responsible for these gradients are discussed. Some of the meteoro logical investigations made by R. A. CRAIG and H. G. BOOKER on the measurement of tem perature and humidity at various heights and the explanation of their distribution by a theor of the modification in air mass by eddy diffusion, are summarized. *Subject Headings:* **1. Super refraction 2. Radio wave propagation 3. Radio transmission ducts 4. Compendiu articles.**—*I.L.D.*

4.8–5 551.510.4

Chapman, Sydney, **Photochemical processes in the upper atmosphere and resultan composition.** (In: **Compendium of meteorology.** Boston, American Meteorological Society **1951.** p. 262–274. fig., 2 tables, 33 refs., 5 eqs.) **MH-BH**—The study of photochemica processes is most important for the development of our knowledge of the upper atmosphere especially the ozone layer. The author gives a detailed outline of general principles of ga chemistry, in so far as they are important for meteorologists (energy levels, light absorptio and emission, atomic and molecular spectra, excitation and de-excitation, dissociation an ionization, collisions, etc.). The absorption and emission spectral evidence regarding uppe atmospheric composition, the heights of the absorbing and emitting layers and the amount of the absorbing and emitting constituents are examined and some facts about ozone, atomi oxygen and atmospheric sodium are summarized. *Subject Headings:* **1. Upper atmosphere**

2. Atmospheric photochemical processes 3. Atmospheric composition 4. Ozone 5. Compendium articles.—*A.A.*

4.8–6 551.5:519.2

Court, Arnold (*Statistical Lab., Calif. Univ.*), **Some new statistical techniques in geophysics.** *Advances in Geophysics*, N. Y., 1:45–85, **1952.** 7 tables, 3 figs., 37 refs. **DLC**—Author sets out recent ideas on frequency distribution functions, including distributions combining two normal functions (bimodal or humped). He goes into detail on the frequency and return period of extreme values, including GUMBEL's theory, with methods and tables for simplifying computation. He then describes GUMBEL's circular normal probability function for distribution of vectors about the mean, and gives a table of the function and procedure for fitting a normal circular curve. The use of equivalent polar paper and other developments are suggested. *Subject Headings:* **1. Statistical techniques 2. Advances in geophysics 3. Review articles.**—*C.E.P.B.*

4.8–7 551.586:616

*de Rudder, Bernhard (*Dir. Univ. Kinderklinik, Frankfurt, a.M.*), **Grundriss einer Meteorobiologie des Menschen. Wetter- und Jahreszeiteneinflüsse.** [Outline of meteorobiology of man. Weather and seasonal influences.] Berlin, Springer, **1952.** 3d ed. 303 p. 56 figs., 30 tables, bibliog. p. 268–296. **DWB**—A systematic treatise on the physiological and pathological influences exerted on human beings by weather processes and seasons. The methodology underlying the scientific study of meteorological phenomena in man is discussed; a brief account of air masses, cyclonic processes in the atmosphere, occlusion processes, föhn and inversions is given; and the application of simple statistical techniques for testing correlation significance and degree of randomness is illustrated. The rest of the book comprises: 1) a detailed survey of the literature on the reactions to weather as revealed by such diseases as eclampsia, circulatory and heart diseases, croup, etc.; the physiological effects of cyclones, inversions, föhn winds, of ozone and atmospheric electricity, 2) the relationship between season and the manifestation and frequency of diseases and 3) meteorological prophylaxis. *Subject Headings:* **1. Meteorobiology 2. Medical meteorology.**—*I.L.D.*

4.8–8 551.515.3(04)(73.9)

*Flora, S. D. (*Ret. from U. S. Weather Bureau*), **Tornadoes of the United States.** Norman, Oklahoma, University of Oklahoma Press, **1953.** 194 p. figs., photos, tables, refs. **DLC**—This is the first time anyone has attempted to publish a complete book on this most devastating meteorological phenomenon. The author has lived for most of his lifetime in Kansas—the state with the greatest number of recorded or reported tornadoes (many states have had greater loss of life and of property than Kansas). The District of Columbia has had 13 times the number of tornadoes per square mile than Kansas which has an average annual frequency of 17.0. This is a freak of statistics which the author recognizes as misleading. The book contains a great amount of statistical synoptic and meteorological information as well as the popular or descriptive material which is naturally to be found in such a work. Among the chapters are one on causes and structure, on the destructive force, on forecasts and warnings, times and places of occurrence, safety precautions, freaks, notable disasters, hazard by states, waterspouts and other squall types of storms and tornadoes in other countries. Many excellent photographs of tornadoes and related events, and maps showing tornado statistics are included. *Subject Headings:* **1. Tornadoes 2. Popular science books 3. United States.**—*M.R.*

4.8–9 55(05) 551.5(05)

Geofisica e Meteorologia. Bollettino della Società Italiana di Geofisica e Meteorologia, Genova. [Geophysics and Meteorology, Bulletin of the Italian Society of Geophysics and Meteorology, Genoa]. Vol. 1, No. 1, Jan./Feb. **1953.** Semimonthly. Price: L 2500 Foreign; L 2300 Italy. **DWB**—A new journal published by the newly founded Italian Society of Geophysics and Meteorology with its headquarters at the University of Genoa (Secretary MARIO BOSSOLASCO, ed. of *Geofisica Pura e Applicata*). The first issue contains several articles of varying length and scientific importance, summaries of conferences, reports and new

inventions, notices of future conferences, expeditions and events, and other material which one finds in the better society publications. The journal is printed on slick paper with good reproduction of illustrative material and high class editing. The material included will cover geomagnetism, geoelectricity, georadioactivity, seismometry, vulcanology, oceanography, hydrology, geodesy, meteorology, etc. *Subject Headings:* **1. Periodicals 2. Geophysics 3. Meteorology. I. Società Italiana di Geofisica e Meteorologia, Genoa.**—*M.R.*

4.8–10 551.510.53

†Gerson, N. C. (*U. S. Air Force, Cambridge Res. Center*), **Unsolved problems in physics of the high atmosphere.** *Advances in Geophysics*, New York, 1:155–242, **1952.** 12 figs., 10 tables, 177 refs. **DLC**—The various subdivisions of the atmosphere (troposphere, stratosphere, chemosphere, ionosphere, mesosphere and exosphere) are defined and discussed. Chemical composition of the atmosphere is discussed and given in tables of the normal chemical constituents, the isotopes, ionization and dissociation potentials of molecules, and probable constitutents of ionosphere and chemosphere, and origin thereof. Also tabulated are temperature, pressure number, density, mean free path and kinematic viscosity at altitudes from 0–800 km in mid-latitudes and two seasons. The ionosphere, emissions (air flow and aurora) and spectra thereof, new techniques for estimating ionospheric winds from cloud (noctilucent, luminous, airglow and sporadic E clouds) movements. States properties and processes such as temperature and its determination by various means, composition as determined from emission spectra and absorption spectra, photochemical equilibrium, collisional phenomena, ionospheric tides and other oscillations, diffusion in magnetic and electric fields and, finally, a summary of unsolved problems which are being or should be worked on. A very extensive bibliography (177 items) on all aspects of high atmospheric physics, is appended. (*Same item as* 4F–97, June 1953, *MAB.*) *Subject Headings:* **1. Upper atmosphere research 2. Atmospheric structure 3. Atmospheric composition 4. Review articles 5. Advances in geophysics.**—*M.R.*

4.8–11 551.521.4:551.510.53

Hulburt, E. O., **Night-sky radiations from the upper atmosphere.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 341–346. 3 figs., 2 tables, 27 refs.) **MH-BH**—The radiations from high atmospheric gases are four or five times as intense as all the other sources combined, if we omit polar auroras and the moonlight. The sources and intensities of the wave lengths in the night sky spectrum are tabulated from 10440 to 3029Å and diurnal and annual variation in the total intensity discussed, which are relatively small. The intensity has a maximum at midnight and in the winter. The atomic oxygen line 5577 has a 27-day variation in intensity caused by solar influences. Almost no changes with latitude are observed. *Subject Headings:* **1. Nocturnal radiation 2. Light of the night sky 3. Upper atmosphere 4. Compendium articles.**—*A.A.*

4.8–12 551.521.61

Krasovskiĭ, V. I., **Issledovanie infrakrasnogo izlucheniia nochnogo neba.** [Investigation of the infrared radiation of the night sky.] *Uspekhi Fizicheskikh Nauk*, Moscow, 47(4):493–514, Aug. **1952.** 7 figs., 24 refs. **DLC**—A review on recent advances, based on 16 Russian and 8 foreign papers, including recent sources of A. B. Meinel and L. Kaplan. Near infrared region covered up to 12,000Å. Spectrographic equipment developed with a dispersion up to 150Å, resolution up to 5Å, exposure few hours. Maximum of intensity during midnight and winter. It was not possible to find radiation of atomic oxygen and nitrogen, as well as of molecular nitrogen. Radiation of molecular oxygen definitely found, Hydroxyl bands also behind 10,000Å. Author gives theoretical explanation of processes involved, assuming that nocturnal radiation is caused by the dissociation energy of molecules, but reviews also other points of view (ozone-hydrogen hypothesis). *Subject Headings:* **1. Infrared radiation 2. Nocturnal radiation.**—*A.A.*

4.8–13 551.511(02)

Logvinov, K. T., **Dinamicheskaia meteorologiia.** [Dynamic meteorology.] Leningrad, Gidrometizdat., **1952.** 148 p. 42 figs., 6 tables, 28 refs., eqs. **DLC**—An up to date and practical but less exhaustive textbook in dynamic meteorology than Belinskiĭ's monumental

ork (*see item* 2.6–7, June 1951, *MAB*) which was published in 1948. The presentation is reatly condensed—that is the equations and rules for use in synoptic analysis and forecasting re clearly presented but not the derivations of these equations, and the number of special ases and illustrations more limited than in BELINSKIĬ. However, in service training of non-neoretical students, this book would be ideal. The general concepts are presented in the rst chapter, thermodynamics of dry and moist air in the second chapter, and the radiation bal-nce in the third. Chap. IV covers statics and Chap. V kinematics of the atmosphere. Chap. VI akes up gradient winds, solenoidal fields, isentropic analysis, surface of discontinuity, fronto-enesis and frontolysis; Chap. VII turbulence and friction (application to transport of momen-um and to change of wind speed with height and change in coefficient of turbulent exchange ith height). Chap. VIII covers "energetics" of the atmosphere (movement of air parcels n a stationary and rotating earth, circulation on these models, and frontal circulation). hap. IX covers the general circulation of the atmosphere, energy and heat transport by the eneral circulation, etc. Chap. X takes up very briefly KIBEL's theory and its application o forecasting and SHVETS' objective method of calculating the diurnal temperature changes. he text is an outgrowth of the author's notes used in training courses given during the war 1943–1945) at Novosibirsk and Kharkov. It is based on the theoretical work of FRIDMAN, OCHIN and KIBEL'. References to a number of recent Soviet works in the field are included; here are many original schematic diagrams and a number of new ideas are introduced into he work. *Subject Headings:* **1. Dynamic meteorology 2. Textbooks.** —*M.R.*

4.8–14 551.586:599.9

†Mitchell, Harold H. and Edman, Marjorie, **Nutrition and climatic stress with particular eference to man.** Springfield, Ill., Charles C. Thomas, **1951.** 234 p. tables, photos, 60 age bibliog. **DLC** —This text is the result of work done by the University of Illinois for the uartermaster Food and Container Institute for the Armed Forces, under contract (*see item* .2–178, Feb. 1952, *MAB*). The work covers a review of the pertinent literature on the hysiological effects of cold, as based on experiments with animals and human beings; effects f heat and effects of altitude on sweat, basic metabolism, work capacity, digestion, respiration, ision, circulation, nutrition requirements, use of vitamins, etc. The emphasis on diet regula-ion as an aid to climatic adaptation and heat or cold tolerance rather than clothing regulation which is more limited in effect) is noteworthy. The body regulates itself against climatic tress through diet, by modifying heat production, heat dissipation, nervous reaction and xygen economy. Effects of radiation, wind and humidity, as well as of temperature and ressure are considered throughout. *Subject Headings:* **1. Bioclimatology 2. Climatic stress . Acclimatization 4. Altitudinal influences 5. Dietetic influences.**—*M.R.*

4.8–15 551.510.5(02)

†*Mitra, Sisir K. (*Prof. of Physics, Calcutta Univ.*), **The upper atmosphere.** 2nd ed. Cal-utta, The Asiatic Society, [preface **1952.**] 713 p. figs., tables, bibliog. p. 644–668, eqs. **MH-BH**—The first edition of this valuable work was published in 1947 (*see item* 1–57, Jan. 950, *MAB*). About 100 pages of new material have been added, including the results of the atest research in almost every field covered by the 13 chapters. These additions include work n escape of atmospheric gases (Chap. I), atmospheric tides (Chap. II), radar studies of meteors Chap. III), variations in ozone content with latitude and air masses (Chap. IV), dissociation of N_2 (Chap. V), ionospheric sounding by radio waves, estimation of recombination coefficients, ides and traveling disturbances in the ionosphere (Chap. VI), Sq and L = variations near the comagnetic equator (Chap. VII), up-to-date bands and lines in auroral spectrum (Chap. VIII), new theories of magnetic storms and aurora by ALFVÉN and MARTYN (extension of Chapman-Ferraro theory) (Chap. IX), Russian work on zodiacal light and afterglow or irglow, height measurements of luminescent layers, hydrogen and sodium in the upper tmosphere, etc. (Chap. X), revised model of temperature distribution in upper atmosphere GERSON) (Chap. XI), a new chapter on rocket exploration of upper atmosphere (V-2 and erobee flights) (Chap. XII), and new unsolved problems of the upper atmosphere (Chap. XIII). Brief discussion of winds at high levels from indirect methods (Chap. XIII). No ttempt at listing all of the important subjects covered in this work would do justice to its omprehensiveness. The amount of carefully prepared illustrative material (charts, graphs,

tables, schematic diagrams, etc.) both borrowed and original, is amazing. In most cases th sources are carefully cited and a class bibliography of nearly 1000 references is a further ai in locating source material on all fields of upper air research by physical methods. *Subje Headings:* **1. Upper atmosphere physics 2. Physics of the atmosphere 3. Textbooks.**—*M.*

4.8–16 551.5(02

Vercelli, Francesco (*Dir. Istituto Talassografico of Trieste*), **L'Aria, nella natura e nell vita.** [Air, its nature and its being.] 2d ed. Turin, Unione Tipografico-Editrice Torinese **1952.** 718 p. photos, diagras., bibliog. p. XXIII. **DLC**—This is probably the most com prehensive and handsomely illustrated text on meteorology ever published. The variety c photographic plates, drawings and diagrams included on every page of this ambitious volum is almost encyclopedic in scope. The present edition contains textual and illustrative materia on such recent findings as the V-2 rocket flights in New Mexico and the latest research o cosmic rays, auroras, terrestrial magnetism, cloud physics, atmospheric electricity, aviatio meteorology, radiation bioclimatology, statistical methods, weather map analysis, long rang forecasting, climatic changes, agricultural meteorology, instrumentation, planetary atmos pheres, medical climatology, jet propulsion, wind tunnel tests, micrometeorological instru ments, etc. Synoptic charts and references in the text show that the material has been revise up to Sept. 1951. In the 386 sections (21 chapters) a great deal of imagination has been use to see that every conceivable aspect of theoretical and applied meteorology is treated. Th various chapters include those on: 1) origin, limits and composition of the atmosphere, 2) pres sure, 3) radiation and temperature, 4) radiation balance, 5) atmospheric structure, 6) winds 7) water vapor and condensation, 8) hydrometeors, 9) atmospheric circulation and disturbances 10) fluctuations and correlations, 11) forecasting, 12) climatic factors and changes, 13) optics and visibility, 14) acoustics and acoustic soundings, 15) atmospheric electricity, 16) bio climatology and meteoropathology, 17) agricultural meteorology and micrometeorology, 18 aerodynamics and utilization of air and wind, 19) applications to lighter than air and 20) heavie than air flight, and 21) modern aviation. *Subject Headings:* **1. Meteorology 2. Aviation meteorology 3. Textbooks.**—*M.R.*

GENERAL METEOROLOGY

See also: **Statistical techniques in geophysics** (Court), 4.8–6; **Geophysics and Meteorology** (*periodical*), 4.8–9; **Air** (Vercelli), 4.8–16.

4.8–17 551.5(02

Dzerdzeevskiĭ, Boris L'vovich, **Vozdushnyĭ okean.** [The "Atmospheric ocean."] Mos cow, Voennoe Izdat., **1952.** 127 p. 47 figs. **DLC**—Semipopular treatment, prepared as an introduction in meteorology for the lower grade army personnel. Author presents the basic facts in the physics of the atmosphere, explains measurements from the ground up to the stratosphere, discusses weather conditions in mountain regions, formation of condensation trails, as well as phenomena in the upper atmosphere. Author mentions briefly that experi ments are under way to "make the desired weather" (p. 9), gives notes on dust storms (p. 12), old weather observations in Russia (p. 28–29, 31), cloud physics (p. 79–87), radio meteorology (p. 93–94), searchlight technique (p. 97–98), observations of abnormal sound propagation (p. 102–103), radio location of meteors (p. 104–106), noctilucent clouds (p. 106–109), counter light of the earth (p. 124–125), etc. *Subject Headings:* **1. Elementary meteorology 2. Text books.**—*A.A.*

4.8–18 551.5(04)(02

†Longstreth, Thomas Morris, **Understanding the weather.** A revision of **Knowing the weather.** New York, Macmillan, **1953.** 118 p. photos, refs., bibliog. p. 109–110. **DWB**— A popular but technically competent book on the weather from the point of view of an amateur. The author has published two previous editions, one in 1914 ("Reading the Weather") and one in 1943 but the present edition is completely rewritten on the basis of the articles in the "Compendium of Meteorology" on such subjects as tornadoes, snow, hurricanes, fronts, rain, climate, etc. and many popular articles in *Weatherwise.* A useful annotated bibliography,

a glossary of technical terms used in the book, climatic extremes for the world and a good index are appended. A rational discussion of the subject of rain making is included. *Subject Headings:* **1. Popular science books 2. Textbooks.**—*M.R.*

4.8–19 551.5(04)

Sloane, Eric, **Weather book.** N. Y., Duell, Sloan & Pearce, **1952.** 90 p. 81 illus. Condensed version of Chap. 1, "The human side of the weather," in: *Science Digest*, 33(3):1–5, March **1953,** under the title: **How weather-wise are you? DLC.** Spanish trans.: **Al tropezar con el mapa meteorologico.** [When you come up against the weather map.] *Revista Nacional de Aeronautica*, Buenos Aires, 13(131):24–25, Feb. **1953.** 4 figs. **DWB**—A collection of articles by the author (4 have been run in *Flying*, and several in *Rudder*), giving a simple but accurate picture of the processes of meteorology or weather through the profuse use of clever illustrations. Of course the popular maxims or signs used by mariners and rustics to foretell the weather for a day or a season, are first described and illustrated. The subsequent chapters discuss the structure and composition of the atmosphere, pressure, isobars, revolving storms, air masses and fronts, warm fronts, cold fronts, line squalls, the synoptic weather map, winds in general, clouds, tornadoes and hurricanes, the aurora, and lastly the artificial production of precipitation by dry ice or AgI seeding. Aside from a very few over-simplifications which cannot be avoided in such a work, the textual and illustrative material is of a very high calibre, and comprises many original ideas for illustrating the practical aspects of the science of weather. The work is 50% illustrative material. In the Spanish translation most of the material is from Chap. 10 "The weather map," and some of the drawings are from Chap. 6 "Fronts and masses." *Subject Headings:* **1. Popular science books 2. Elementary meteorology 3. Translations.**—*M.R.*

4.8–20 551.5:06:63

Korte, W., **Wetterdienst und Landwirtschaft, Erfahrungen der Wetterwarte Celle.** [Weather service and agriculture, experiences of the Celle Observatory.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:208–213, **1952.** 3 figs. **DWB**—The station at Celle, Hanover, has since 1948 given special attention to weather service for agriculture, including short-term and 7 day forecasts, relations between crops and rainfall during the growing season and special weather reports. *Subject Headings:* **1. Agricultural meteorology 2. Celle, Hanover.**—*C.E.P.B.*

4.8–21 551.5:629.13(02)

Halpine, Charles Greham (*U. S. Navy, retired*), **A pilot's meteorology.** 2nd ed. New York, Van Nostrand, **1953.** 351 p. figs., maps, forms, glossary. p. 297–318. **DLC**—This second edition of a work which first appeared in 1941 has a chapter (XII) on Pressure Pattern Flight or Aerolocation (written by ROBERT M. MANSFIELD of Y.W.A.), which presents one of the most recent applications of modern meteorology to air navigation. (Nomograms and tables for calculation are appended.) The other chapters include the usual discussion of atmospheric structure, meteorological elements and their measurement, clouds, hydrometeors, visibility, air masses, fronts, synoptic charts and forecasts and ice formation on aircraft. The appendix contains a useful glossary of terms used in aeronautical meteorology as well as examples of surface and upper air charts, diagrams, etc. The text is not too advanced for the practical navigator, yet up-to-date enough to stand up under professional scrutiny. *Subject Headings:* **1. Aeronautical meteorology 2. Pressure pattern flying 3. Textbooks.**—*M.R.*

4.8–22 551.5:63:06(47)

Bobrov, V. IA. and Soloshenko, V. A., **Meteorologicheskoe obsluzhivanie sel'skogo khoziaĭstva Stavropol'skim Gidrometeorologicheskim biuro v 1951 g.** [Meteorological service for agriculture by the Stavropol' Hydrometeorological Office in 1951.] *Meteorologiia i Gidrologiia*, No. 5:8–12, **1952. DLC**—Hydrometeorological Bureau at Stavropol regularly rendered special service to 350 agricultural institutions and organizations. The principal forms of this service were the long range weather forecasts (for season, month and three-day periods) weather prognoses for next 36 hours, meteorological and agro-meteorological summaries of observations and special reviews published in special agro-meteorological bulletins

(daily and for ten days). Special warnings of dangerous weather phenomena were issued by radiophones and newspapers. The author proposes the following improvements for more effective service: daily reports from agro-meteorological network issued by telegraph must contain data from 7 a.m. to 7 a.m. (now from 7 p.m. to 7 p.m.), characteristics of height of snow cover and of ice crust for winter, and soil temperatures at depth 20 and 40 cm for spring. The conditions of passability of roads are also considered as important information. *Subject Headings:* **1. Agro-meteorological services 2. Stavropol, Caucasus, U.S.S.R.**—*N.T.Z.*

4.8–23 551.5:63:92

Maksimov, S. A., **Osnovatel' sel'skokhoziaĭstvennoĭ meteorologii Petr Ivanovich Brounov.** [The founder of agricultural meteorology, Petr Ivanovich Brounov.] *Meteorologiia i Gidrologiia*, No. 7:51–53, **1952. DLC**—Review of scientific works of P. I. BROUNOV (born December 21, 1852, died April 24, 1927). P. I. BROUNOV, after graduating from the Physical-Mathematical Faculty of Petersburg University in 1875, started to work at the Central Physical Observatory. Many original investigations by BROUNOV on weather analysis and study of directions of cyclone movements were carried out there. He was the first to introduce the so-called isobar method. In 1890 he was elected professor of Kiev University and continued his scientific activities by investigating the relation between climatic conditions and agriculture. BROUNOV formulated the problem of a new science—agricultural meteorology as a study of meteorological factors and their relation to soil and life of plants and animals. In 1897, at BROUNOV's suggestion, a special institution, "Meteorological Bureau," for the organization of a special network of agro-meteorological stations, investigation of influence of meteorological elements on growth of cultural plants, development of methods of agro-meteorological observations and for special study of atmospheric processes dangerous for agriculture was established. In 1904 BROUNOV founded "Trudy po Sel'skokhoziaĭstvennoĭ Meteorologii" (Transactions in agricultural meteorology), a periodical well known inside and outside of Russia. Genetic system of climates and criterion of drought introduced by BROUNOV were used largely for agroclimatic regionalization. *Subject Headings:* **1. P. I. Brounov 2. Agricultural meteorology 3. Biography.**—*N.T.Z.*

4.8–24 551.5:63 551.579.5:551.577.38

Unger, K., **Agrarmeteorologische Studien. I. Agrarmeteorologische Untersuchungen bei der Leistungsprüfung. II. Bodenfeuchtigkeitsbestimmungen unter einer Standardfläche und unter verschiedenen Pflanzenbeständen zur Charakterisierung der Dürrewirkung.** [Agro-meteorological studies. I. Agrometeorological investigations in production tests. II. Soil humidity determinations beneath a standard surface and beneath various plant stands to define drought effect.] *Germany. Deutsche Demokratische Republik. Meteorologischer Dienst, Abhandlungen*, 3(19), **1953.** 27 p. 10 figs., 4 tables, 33+7 refs. **DWB**—Pt. I (p. 5–22) discusses statistical technique of agrometeorological investigations, exemplified by: observations at Quedlinburg on microclimatology of stands of different varieties of pea and bean; light conditions in pea stands; influence of temperature on growth period of peas; evaluation of many year investigations depending on weather factors. In Pt. II (p. 23–27), soil moisture measurements to a depth of 100 cm in sandy loam under various crops are compared with grass. Effect of drought periods on yield of cabbage is described in detail. *Subject Headings:* **1. Agricultural meteorology 2. Soil moisture 3. Drought.**—*C.E.P.B.*

4.8–25 551.5:631.4(47)

Makarov, B. N., **Dinamika gazoobmena mezhdu pochvoĭ i atmosferoĭ v techenie vegetatsionnogo perioda pod razlichnymi kul'turami sevooborota.** [Dynamics of gas exchange between soil and atmosphere during the vegetative period of various rotated crops.] *Pochvovedenie*, Moscow, 3:271–277, March **1952.** fig., 8 tables, 12 refs. **DLC**—A simple method for the determination of the gas exchange, using a glass box, is described. The development phase of the crop has a great influence on the gas exchange, which increases during the growth: under the plant cover the gas exchange is several times more intensive than on black fallow. Higher temperatures are connected with a greater exchange. A more intensive gas exchange is observed on richer soils. Experimental data are given. *Subject Headings:* **1. Gas exchange soil-atmosphere 2. Agricultural meteorology 3. U.S.S.R.**—*A.A.*

4.8–26 551.5:631.4(47)

Turfliun, I. A., **Novyĭ metod i pribory dlia issledovaniia gazoobmena v pochvakh.** [A new method and instruments for the investigation of gas exchange in soils.] *Pochvovedenie*, Moscow, No. 1:72–80, Jan. **1952.** 3 figs., 6 tables, 12 refs. **DLC**—Descriptions of practicable equipment for the collection of air samples from the atmosphere and soil, of a soil thermometer, and of a gas analyzer are given, and the results of measurements with these apparatus are presented. *Subject Headings:* **1. Agricultural meteorology 2. Gas exchange soil-atmosphere 3. Instruments.**—*A.A.*

4.8–27 551.5:632.187

Thams, J. C., **Zur Meteorologie der Waldbrände im Tessin.** [On the meteorology of forest fires in Ticino.] *Leben und Umwelt*, 9(8):169–173, May **1953.** 2 figs., ref., photo on cover. **DLC**—In Ticino Canton (SE Switzerland) 199 forest fires were observed in 1938 through 1952, mostly on S slopes. They disturb measurements of solar radiation. They are most frequent in April (end of dry season), least June–Sept. when leaf cover maintains soil humidity except in very dry years (1945). They occur mostly in periods of N föhn or anticyclonic weather. *Subject Headings:* **1. Forest fires 2. Fire weather 3. Ticino, Switzerland.**—*C.E.P.B.*

4.8–28 551.5:632.187(058)

*U. S. Weather Bureau, **Annual fire-weather summaries; 1951 fire season, western fire weather districts. [I. California district; II. Oregon district; III. Washington district; IV. Missoula district; V. Boise district.]** San Bruno, Cal., Fire Weather Office, Weather Bureau Airport Station, **1951.** [122 p.] charts, graphs, tables. **DWB**—The report for California gives seasonal and monthly summaries for Northern, Central and Southern California, respectively, relative humidity by decades, dates of thunderstorms and precipitation charts (isohyetal) for each month June–Oct. 1951. The Oregon report is mainly descriptive, with a comparison of the 1951 fire season and other years (1951 was the severest fire season since 1932). The Washington report gives daily weather conditions at 13 stations and summary of lightning days and precipitation (in charts and in tables). Similar data are shown on charts for Montana and in tables for Idaho. *Subject Headings:* **1. Fire weather reports 2. Forestry 3. Thunderstorm data 4. California 5. Oregon 6. Washington 7. Montana 8. Idaho. I. Cramer, Owen P. II. Kirkpatrick, Robert.**—*M.R.*

4.8–29 551.5:634.9:581.1(438)

Molga, Marian, **Stan obecny i potrzeby meteorologii leśnej w Polsce ludowej.** [The actual status and needs of forest meteorology in Polish Peoples Republic.] *Przegląd Meteorologiczny i Hydrologiczny*, 1950/1951:329–338, **1951.** **DWB**—A description of the only two centers in which forest-meteorological investigations were made in Poland before the war. The future work, which has to be done in Poland, the author classifies into three groups: 1) studies on meteorological conditions in forest fires and organization of a preventive warning service; 2) development of investigations on the ecoclimate of forest biotopes, and also on the changes of ecoclimate due to the dynamic bioecological changes in the forest unit and 3) methodological studies on measurements used in the forest meteorology in the Rogow station, near Koluszki. *Subject Headings:* **1. Forest meteorology 2. Forest fires 3. Plant ecology 4. Poland.**—*W. Tomczykowski.*

4.8–30 551.5:378.2:551.501.1(02)

Pergande Publishing Co., Milwaukee, **Meteorological aid.** Milwaukee, Wisc., Pergande Publ. Co., **1950.** Reprinted & enl. **1950.** 74+16+12+19 p. illus. **DLC**—A manual for those desiring to take the observers (meteorological aid) examination for positions in the Government Service (mainly U. S. Weather Bureau). The separate chapters include duties, experience, qualifications, method of scoring, and practice questions for the meteorology, mathematics, general intelligence, and chart gauge and scale reading sections of the examination; answers to sample questions are given in the back of the book. *Subject Headings:* **1. Civil Service Examinations 2. Opportunities in meteorology 3. Observers manuals 4. Textbooks 5. United States.**—*M.R.*

4.8–31 551.5:92

König, W., **Nachruf auf Professor Dr. Max Robitzsch.** [Obituary for Professor Dr. Max Robitzsch.] *Zeitschrift für Meteorologie*, 6(7):193–194, July **1952. Veröffentlichungen von Max Robitzsch.** [Publications of Max Robitzsch.] *Ibid.*, p. 195–197. 96 refs. **DWB** – Scientific activities of Dr. Max Robitzsch (1887–1952), outstanding aerologist, are described. He spent the longest period of his active life at the observatory of Lindenberg. His biggest contribution was the development of aerological measurement techniques (kites and captive balloons) and investigation of humidity (it was he who introduced the notion of equivalent-potential temperature). A complete list of his publications, most of them dealing with observation of various meteorological elements, is attached. The author particularly regrets that his untimely death prevented Robitzsch from lending the German Meteorological Service his rich experience to the benefit of a new project whose aim is a revival of kite sounding with a view of obtaining more detailed upper air data. *Subject Headings:* **1. Obituaries 2. Robitzsch, Max 3. Bibliographies.**—*G.T.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Meteorological aid**, 4.8-30; **Effect of atmos. inhomogeneity on interpretation of vertical temp. soundings** (Sawyer), 4.8–124; **Theoretical studies related to growth of precipitation particles . . .** (Wexler, Boucher), 4.8–174; **Radar precipitation intensity measurement** (Twomey), 4.8–189

4.8–32 551.501:551.521.63

Lenoble, Jacqueline, **Mesures préliminaires par enregistrement spectrographique de l'ultra-violet solaire à Paris.** [Preliminary spectrographic measurements of ultraviolet solar radiation at Paris.] *Annales de Géophysique*, 8(1):65–75, Jan./March **1952.** 14 figs., 7 refs. English summary p. 65. **DWB**—This is a preliminary report on progress made in a project whose objective is to measure UV solar and sky radiation received on a horizontal surface in order to determine its frequency distribution and the absolute values obtained on an area of 1 cm^2. The apparatus used is described and illustrated. It consists of a spectrograph combined with a clock mechanism moving a photographic film on which measurements are recorded. Qualitative and preliminary quantitative results obtained in first measurements are indicated and recordings reproduced. *Subject Headings:* **1. Ultraviolet radiation measurement 2. Spectrographs.**—*G.T.*

4.8–33 551.501:551.508.71:681.1

Paracchini, Salvatore and Nani, Lorenzo, **Regolo pratico per il calcolo degli elementi igrometrici in base ai dati psicrometrici.** [Practical slide rule for calculation of hygrometric elements on the basis of psychrometric data.] *Rivista di Meteorologia Aeronautica*, 12(2):26–34, April/June **1952.** 5 figs., eqs. Italian, French, English and German summaries p. 26. **MH-BH**—Description of a method adopted in constructing a slide-rule to calculate the following elements: dew point; relative humidity; maximum specific humidity; specific humidity; saturation vapor pressure; vapor pressure. *Subject Headings:* **1. Humidity measurement techniques 2. Slide rules.**—*Authors' abstract.*

4.8–34 551.501:551.574.1

Sivadjian, Joseph, **Analyse hygrophotographique des gouttelettes de pluie et de brouillard.** [Hygrophotographic analysis of rain and fog droplets.] *Académie des Sciences, Paris, Comptes Rendus*, 236(1):109–111, Jan. 5, **1953.** 11 refs. **DWB**—The technique described in this note utilizes cobwebs of *Aranea* spiders on which droplets are captured and then registered on hygrophotographic plates. Droplets with a diameter as small as 20μ can be measured. A hygrophotographic record is presented. *Subject Heading:* **1. Drop size measurement.**—*G.T.*

4.8–35 551.501.5:551.509.3

Platzman, George W. (*Univ. of Chicago*), **Some remarks on high-speed automatic computers and their use in meteorology.** *Tellus*, 4(3):168–178, Aug. **1952.** 5 figs., tables, 3 refs.

H-BH—Using as a basis the reports of GOLSTINE and VON NEUMANN, the author discusses e logical design of an electron digital computer, describes a simple problem which illustrates pical steps leading to the formulation of a computation, namely, the program, and shows the quence of logical steps by which the control executes the program by means of a flow diagram. he application of high speed automatic computers to forecasting radiational temperature anges in the free atmosphere and the forecasting of high level winds over short periods is scussed. *Subject Headings:* **1. Electronic computers 2. Short range forecasting.**—*I.L.D.*

4.8–36 551.501.45:519.2

Fürth, R. (*Birbeck College, Univ. of London*), **On the theory of stochastic phenomena and s application to some problems of cosmic physics.** *Dublin Institute for Advanced Studies. chool of Cosmic Physics, Geophysical Bulletin*, No. 5, July **1952.** 27 p. 15 figs., 11 refs., 4 eqs. **MH-BH**—Many phenomena show small rapid irregular variations, "stochastic henomena." The mathematical basis of such movements is set out with the simple example 1-dimensional Brownian movement and the effect of averaging over time considered; the ean square displacement and mean displacement are influenced by position at beginning the interval ("after-effect functions"). Superposition of a cyclic variation, regular or regular in time, effect of regular pulses, and discrete variables are discussed. Author then ts out principles of autocorrelation and the idea of a spectrum or irregular fluctuations. A w meteorological examples are included. *Subject Headings:* **1. Methods of computation Probability theory.**—*C.E.P.B.*

4.8–37 551.501.6:551.542.1:551.557

Hovde, John E. and Reber, Carl M. (*U. S. Weather Bur.*), **Graphical determination of the eostrophic wind over a point or small area.** *American Meteorological Society, Bulletin*, 3(8):326–328, Oct. **1952.** fig., 2 refs. **MH-BH**—Determinations of the geostrophic wind by aling from analyzed charts or from two pressure or contour height values that are near or on pposite sides of the area involved are subjective. An objective graphical method for determin- g the geostrophic wind is discussed and the construction of the geostrophic wind graph is eproduced. On the assumption of "straight parallel and evenly-spaced contour heights or obars over a small area it is possible to determine graphically the total pressure gradient rce (and the geostrophic wind) graphically by using the contour height or sea level pressure fference between 3 stations around the area." *Subject Headings:* **1. Graphical presentation Geostrophic winds.**—*I.L.D.*

4.8–38 551.501.7:551.552

Braham, Roscoe R.; Seely, Ben K. and Crozier, W. D., **A technique for tagging and tracing r parcels.** *American Geophysical Union, Transactions*, 33(6):825–833, Dec. **1952.** 12 figs., refs. **MH-BH**—Experiments conducted in May 1951 by the New Mexico Institute of Mining and Technology are reported. They comprised dispersal of a fluorescent pigment, ampling of the dispersed aerosols by means of air-borne impaction equipment and microscopic dentification of collected particles with the use of UV illumination. Apparatus used is de- cribed and illustrated. Particle concentration data obtained in three of the flights are resented and discussed. Cumulative values of particle concentration and of plume width are lotted against distance from the source up to 107 and 40 mi, respectively. Results appear o indicate feasibility of the method. For the dispersal a "dry duster" is recommended rather han the unnecessarily cumbersome military smoke generator used in some of the tests. *Sub- ect Headings:* **1. Particle trajectories 2. Upper air research.**—*G.T.*

4.8–39 551.501.7:551.508.822

*§Corton, Edward L., Jr., **A radiosonde ascent through the Sierra Wave.** *U. S. Naval rdnance Test Station, Technical Memorandum*, 225, Aug. 10, **1951.** 14 p. 3 tables, 8 figs., refs. **DWB**—Results of a radiosonde ascent Jan. 18, 1951 presented in tabular and graphical orm show three levels of updraft (maximum velocity 1200 ft/min), with a discontinuity surface t 6,000 ft. Horizontal wind velocities were somewhat lower in the downdrafts. Streamline opes are tabulated, and all results of this compared with those of previous ascents. *Subject Headings:* **1. Radiosonde ascents 2. Sierra Wave 3. Orographic turbulence 4. Dis- ontinuity surfaces.**—*From author's abstract.*

OBSERVATIONAL DATA

See also: **Annual temp. variation, Potsdam** (Branicki), 4.8–127; **Drought, heat of spring, summer 1947** (Sanson), 4.8–198.

4.8–40 551.506.7:629.13

Godson, Warren Lehman, **The application of upper air statistical wind data to flight-planning problems.** *Canada. Meteorological Division, Cir.* 2168, Tec. 122, Oct. 1, **1952.** 26 p. table, 6 refs., 93 eqs. **DWB**—The theory of upper wind statistics is applied to determine the frequency distribution of equivalent tail winds. Relations are presented for the mean and the standard deviation of the equivalent tail wind. The assumption of an elliptical distribution of probability density for the mean wind over a leg is shown to yield a distribution of equivalent density for the mean wind over a Gaussian. Methods of computation of the parameters involved are presented and their time-combination discussed. Techniques for the incorporation of ascent and descent flight procedure into the above computations are presented. Formulae for the mean and standard deviation of the resultant equivalent tail wind are given for relatively short flight routes and for relatively long routes. *Subject Headings:* **1. Upper air wind data 2. Flight plans 3. Tail winds.**—*Author's abstract.*

4.8–41 551.506.7:551.524.7(54)

*Krishna Rao, P. R. (*Regional Met. Center, Madras*), **Some high sounding balloon ascents and upper air temperatures up to 35 km over India.** *Indian Journal of Meteorology and Geophysics*, 3(3):173–185, July **1952.** 5 tables, 6 figs., 7 refs. **DWB**—Pressure and temperature data from 34 sounding balloon ascents reaching 30 km and sometimes up to 36 km are presented and summarized. Average for summer and winter are computed and the tropopause and lapse rate variations discussed. The results do not show any large increase of temperature with height above 25 km, as was estimated previously. *Subject Headings:* **1. Vertical temperature distribution 2. Stratosphere 3. Tropopause height 4. India.**—*A.A.*

4.8–42 551.506.8(432.2)

*†Böer, Wolfgang, **Witterung und Pflanzenwachstum (unter Benutzung langjähriger phänologischer Beobachtungen aus Thüringen).** [Weather and plant growth (utilizing long-period phenological observations in Thuringia).] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 2(14), **1952.** 64 p. 12 figs., 44 tables, 25 refs. **DWB**—Long series of phenological observations at 9 stations are summarized statistically and compared with 5-day means of temperature, etc. at Jena. Plants discussed are snowdrop, horse chestnut, lilac, elder, winter rye, beech; agricultural and animal phenology is also considered. Temperature is the dominant influence, especially spring temperature, effect of which persists till autumn; rainfall is less important. Influence of weather type is shown by association of beginning of phenological phases with anticyclonic types. A mean phenological year is constructed and the influence of height (100–600 m) plotted. *Subject Headings:* **1. Phenological observations 2. Plant growth 3. Thuringia, Germany.**—*C.E.P.B.*

4.8–43 551.506.8:616

Hyde, H. A., **Phenology of British hay-fever plants and its significance to allergists.** *British Medical Journal*, 1:897, May 21, **1949.** 4 p. fig. Abstracted from reprint.—Gives a calendar of occurrence and concentration of air-borne pollen of different species in England and Wales with notes on their distribution and antigenic properties. *Subject Headings:* **1. Phenology 2. Hay fever.**—*C.E.P.B.*

4.8–44 551.506.8:551.584.3

Uhlig, Siegfried, **Die Phänologie als Hilfsmittel bei der kleinklimatologischen Geländeaufnahme.** [Phenology as an aid in microclimatological cartography.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:238–243, **1952.** 4 figs., 5 refs. **DWB**—Author proposes use of certain phenological data to aid in preparing climatic charts on a scale of 1/10,000 to 1/25,000—dates of plant phases and plant state on given dates. Examples given are charts of winter state of winter rye on certain dates. *Subject Headings:* **1. Phenology 2. Topographic effects.**—*C.E.P.B.*

INSTRUMENT CARRIERS

See also: **Raindrop size measuring apparatus,** 4.8–55.

4.8–45 551.507.321.2

Herz, A. J. and Tennent, R. M., **Ballooning for research.** *Science News*, 27:46–58, **1953.** figs. **DWB**—Account of flight peculiarities of open-necked and closed balloons used for adiosonde and cosmic ray investigations, "Skyhook" balloons, etc., tracking and height measurements. *Subject Heading:* **1. Sounding balloons.**—*C.E.P.B.*

4.8–46 551.507.321.2

Matsuoka, Y. and Kobayashi, Y., **On the ascending velocity of pilot balloons, 2nd report.** Tateno, *Japan. Aerological Observatory, Journal*, 5(1):6–9, March, **1951.** 3 figs., 2 tables. n English. **DWB**—The authors found that the ascending velocity of the balloon from the round up to 900 m is greater than in the upper layer. They tried to reach a more uniform scent rate by applying a paper hoop making the relative flow of air turbulent. Five parallel scents were made with the hoop-equipped and unequipped balloons and the results presented. Due to the great variability of ascension rates these few ascents are not sufficient to draw a onclusion. *Subject Headings:* **1. Balloon ascension rates 2. Pilot balloons.**—*A.A.*

4.8–47 551.507.321.2

Molded Latex Products, Inc., **High altitude balloon research and development.** Contract DA-36-039-sc4, Project DA 3-99-07-922, 9th and 10th Quarterly Reports, Oct. 31, **1951;** an. 31, **1952.** 2 pieces. tables. **DWB**—Additional experiments made to develop a neoprene alloon capable of carrying a 5-pound pay-load to an altitude of 150,000 ft reported. Com- ound used in previous experiments modified to obtain better ozone resistance. Although this bjective was reached, little improvement in altitude achievement was noticed over flights ith balloons of inferior ozone resistance. Data on burst and flight tests tabulated. *Subject Headings:* **1. High altitude balloons 2. Pilot balloon bursting. I. Contract DA-36-039-sc4.**—*G.T.*

4.8–48 551.507.321.2:551.510.53

New York University. College of Engineering. Research Div., **Constant level balloon roject.** Contract W28-099-ac-241, Technical Report No. 93.03, March 1, **1951.** 27 p. 5 figs., table, 7 refs. **DWB**—The project reported in this paper was based on a contract etween Watson Laboratories, Air Material Command and the reporting agency. The ontract was operative from 1946 to 1950 and called for the development of balloon and quipment, which would be maintained at a constant altitude of 10 to 20 km over periods of to 48 hours, collect data on pressure, temperature and sound propagation, and transmit the nformation to a radio receiver on the ground. As a result of the completed task detailed escriptions of ballast-control and telemetering systems are presented as well as a complete st of equipment needed for launching of a flight. Reference is made to the projects "High ltitude balloon trajectory study" and "High neutron intensity study" which supersede the roject reported in this document. *Subject Headings:* **1. Constant level balloons 2. Balloon esearch 3. Upper atmosphere research. I. Murray, William D. II. Contract W28-099- c-241.**—*G.T.*

INSTRUMENTS

See also: **Slide rule for calculation of hygrometric elements** (Paracchini), 4.8–33; **Radio- sonde ascent through Sierra Wave** (Corton), 4.8–39; **Polarization of light from il- luminated areas in ceilometer beam during rain** (Jorgensen), 4.8–272; **Lightning research** (Norinder), 4.8–280.

4.8–49 551.508.7

Kamiyama, K., Eguchi, M., Yatabe, Y. and Moriguchi, M., **Determination of precipitable ater in air by near infra-red spectrometry.** *Geophysical Magazine*, Tokyo, 23(1):59–64, ec. **1951.** 9 figs., 6 refs. **MH-BH**—Description of amplifier and optical system. Using .375μ as absorption band and 1.250μ as reference band, calibration curves and field tests re shown. *Subject Headings:* **1. Infrared spectrometers 2. Precipitable water.**—*A.A.*

4.8–50 551.508.7

Wolff, Edward (*Naval Res. Lab., Wash., D. C.*), **An airborne flow meter for measuring rain.** *American Meteorological Society, Bulletin*, 33(9):369–372, Nov. **1952.** 7 figs., 7 refs. **MH-BH**—With the aid of diagrams and photographs the author describes a flow meter for measuring the rate at which water is collected during flight through a rain area. In this flow meter, the change of position of an oscillating mercury filament in a capillary tube is a measure of the amount of water entering the system which consists of a capillary collector, coaxial capacitor measuring unit and a recording device. *Subject Headings:* **1. Air-borne flow meters 2. Water content of air.**—*I.L.D.*

4.8–51 551.508.76

Kuroiwa, Daisuke and Kinoshita, S., **A new type of fog meter which is carried by balloon and used to measure the liquid water content of fog in the upper air.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl., p. 185–194, March **1952.** 11 figs., 5 refs., 8 eqs. In Japanese, English summary p. 331–333. **MH-BH**—The instrument, described and illustrated in detail, includes a wire cage to collect fog particles and conduct them to a funnel, and a 3-cup anemometer. Recording is by an electrical counter or recording tape for number of drops (of fixed size) from the funnel. Measurements by balloon up to 80 m are illustrated. *Subject Heading:* **1. Fog meters.**—*C.E.P.B.*

4.8–52 551.508.76

Tabata, T., Fujioka, T. and Matsumura, N., **On a new type of recording fog meter.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl., p. 195–202, March **1952.** 9 figs., 2 refs., 8 eqs. In Japanese, English summary p. 333. **MH-BH**—Fog particles captured by a vertical wire screen fall as droplets which are counted. The count is interrupted by a cup anemometer every 1000 m of wind run. Specimen record and tabulation of fog water content shown. *Subject Heading:* **1. Fog meters.**—*C.E.P.B.*

4.8–53 551.508.762:551.508.822

Cook Research Laboratories, Chicago, **Cloud level investigation and indicator.** Contract No. No-as-51-985-c, Final Progress Report No. FPR 21–2, Oct. 7, **1952.** 16 p. 10 figs. **DWB**—An instrument designed to be installed in the air duct of a regular radiosonde, and measuring the amount of light of a mercury vapor discharge lamp reflected by the cloud, is described. The unit weighs 900 gm including batteries. Cold chamber and flight tests are reported and discussed. The apparatus is found to have high sensitivity so as to detect even slight obstructions to visibility as haze, dust, smoke, etc. Circuit diagrams and test records are presented. *Subject Headings:* **1. Cloud height indicators 2. Radiosondes. I. Contract No-as-51-985-c II. Killian, Leo G.**—*G.T.*

4.8–54 551.508.765:551.578.11

Boucher, Roland J. (*Cambridge, Mass.*), **Results of measurements of raindrop size.** *Illinois. State Water Survey Div., Bulletin*, No. 41, **1952.** p. 293–297. **DWB**—A technique of measuring raindrop size distribution using a nylon screen is described. Results of 63 rain samples obtained by this method at Cambridge give a value of $Z = 269\ R^{1.55}$ by a regression of log Z on log R. The standard error is 47%. A better fitting line, obtained by trial and error, is $Z = 180R^{1.55}$, which reduced the standard error to 38%. *Subject Heading:* **1. Raindrop size distribution measurement.**—*Author's abstract.*

4.8–55 551.508.765:551.507.352

NRL develops apparatus for measuring rain drop size. *U. S. Office of Naval Research, Research Reviews*, March **1952.** p. 25. illus. **DWB**—A "disdrometer," an instrument measuring the momentum and thus indirectly the size of raindrops from an aircraft in flight, is shown on an annotated photo. *Subject Headings:* **1. Disdrometers 2. Raindrop size meters 3. Airplane observations.**—*G.T.*

4.8–56 551.508.765:551.578.11

Smith, L. G. (*Imperial Col., London, Eng.*), **New method to measure raindrop size.** *Illinois. State Water Survey Div., Bulletin*, No. 41:299, 1952. **DWB**—A method worked

ıt at Cambridge, Eng., for measuring size of raindrops by change in capacity of a parallel ate condenser when a drop falls between the plates. The effect of the drop is to produce change of frequency in the circuit of an oscillator (120 Mcps). The signal is reduced first 10 Mcps and then to 0.5 Mcps, the frequency deviation being unaltered, and detected in a ıase discriminator. In this way a voltage pulse is obtained which is proportional in magnitude the mass of the drop. *Subject Headings:* **1. Raindrop size measurement 2. Raindrop size eters.**—*From author's abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **High-speed automatic computers** (Platzman), 4.8–35; **Numerical tendency computations for barotropic vorticity equation** (Bolin, Charney), 4.8–87; **Radiation fog, Montreal** (Mehaffy), 4.8–177; **Weather situations by sea fog, 1951** (Morita), 4.8–178; **Rain aplenty, Arizona,** 4.8–188.

4.8–57 551.509

Alpert, Leo (*U. S. Air Force, Cambridge Res. Ctr., Mass.*), **Global synoptic maps.** *Amerin Meteorological Society, Bulletin,* 33(10):435–437, Dec. **1952.** 2 figs., 3 refs. **MH-BH**—y combining the daily sea level synoptic analysis of the Southern Hemisphere from the ıuator to the Antarctic Continent prepared by the U. S. Weather Bureau, M.I.T. Southern emisphere Map Analysis Project, with the daily synoptic analysis of the Northern Hemisphere om the North Pole to the equator available in the Daily Historical Weather Maps, global ıalysis can be carried out. Surface synoptic maps for March 15 and 20, 1949 are shown. he strong zonal westerly circulation of the Southern Hemisphere contrasts with the weak esterly circulation of the Northern Hemisphere. The circulation of the Southern Hemisphere distinguished by a series of low pressure centers all around the hemisphere, poleward of the ıbtropical high pressure belt. The Northern Hemisphere circulation is essentially meridional. *ubject Headings:* **1. Global synoptic maps 2. Synoptic analysis 3. Southern Hemisphere Northern Hemisphere.**—*I.L.D.*

4.8–58 551.509(02)

Holland, D. J., **Weather inference for beginners made clear in a series of actual examples.** ambridge [Eng.], University Press, **1953.** 196 p. 51 figs., tables. **DWB**—This book ts out with a minimum of mathematics the basis of synoptic weather forecasting. The ıthor's method is to use his observed weather changes near London during a series of days 1936 to illustrate coding (on a system modified from official codes) and the physical principles. hapters explain thermodynamics of moist air, tephigrams, instability, radiation, air masses, adient winds and fronts. Chap. 8 is a discussion of synoptic charts of W. Europe Oct. 8–26, 936, illustrating sequence of surface weather types, anticyclones, fronts, etc. The final ıapter leads from upper air analysis to some general remarks on the work of the official recaster. *Subject Headings:* **1. Weather forecasting 2. Textbooks.**—*C.E.P.B.*

4.8–59 551.509.317:551.511

*Cressman, George P., **An application of absolute-vorticity charts.** *Journal of Meteorogy,* 10(1):17–24, Feb. **1953.** 5 figs., 2 tables, 10 refs., 3 eqs. **MH-BH**—Charts of absolute ortıcity (vertical component) over U. S. at 700, 500 and 300 mb are illustrated and comıtation described. The best level for forecasting changes of flow pattern is that at which ıanges of absolute vorticity move with the wind; this "equivalent barotropic surface" is ıout 600 mb. Some sequences of vorticity patterns occur repeatedly and can be used in 1-hr forecasting. Examples shown are a rapidly moving pattern, stationary pattern, and ıpid trough development. Careful computation and analysis are required. *Subject Headgs:* **1. Synoptic aerology 2. Vorticity.**—*C.E.P.B.*

4.8–60 551.509.33:517.512.2(753)

Abbot, Charles G. (*Res. Asso. Smith. Instn.*), **Precipitation and temperature in Washgton, D. C., for 1951 and 1952.** *Smithsonian Miscellaneous Collections,* 117(9), March 18, 952. 5 p. 2 tables, 2 figs. On t-p: Roebling Fund. *Smithsonian Institution, Publication*

4087. **DWB**—Based on a cycle of 27.0074 days for precipitation and 6.6485 days for temperature, the author has prepared another of his annual long range forecasts, wherein o Jan. 14, 1952 (published in March 1952) the dates during 1952 on which heavier than averag rainfall or fewer lower than average temperature (minima for week) are respectively expected Verification of last year's (1951) forecasts against observed values for Washington, D. C. i also tabulated. The precipitation forecast for 1951 was correct in all months except Jan June, July, Sept. and Oct. The ratio of rainfall on preferred to that on nonpreferred date was 134%. *Subject Headings:* **1. Long range forecasting 2. Temperature cycles 3. Precipitation cycles 4. Washington, D. C.**—*M.R.*

4.8–61 551.509.5:551.515.3(781/2

Shuman, F. G. and Carstensen, L. P. (*U. S. Weather Bur., Wash., D. C.*), **A preliminar tornado forecasting system for Kansas and Nebraska.** *Monthly Weather Review*, 80(12):233 240, Dec. 1952. 11 figs., 3 refs. 8 eqs. **MH-BH**—Attempt to establish an objective fore casting system of tornadoes for 12 hours in advance, based on weather situations at 1500 GMT analyzed for 14 selected months. Group selected with 60% tornado probability which in cludes 30% of all reported tornadoes. Necessary conditions for the occurrence of tornadoes are a strong contrast in temperature advection across a pressure trough (700 mb) above th area, when a deep cold air mass lies westwards and maritime tropical air over or southeast of th area. Quantitative characteristics for these conditions selected. Formulas for computing temperature advection by triangulation developed. *Subject Headings:* **1. Tornado forecasting 2. Objective forecasting 3. Advection 4. Kansas 5. Nebraska.**—*A.A.*

4.8–62 551.509.5

Klein, M., **Quantitative forecasting of the diurnal rainfall for the central coastal plain in Israel. First and second interim reports.** *Israel. Meteorological Service, Series C*, No. 5 1952. 16 p. figs., map, 5 tables, 3 refs. Mimeographed. **DWB**—Forecast formulas for 24 hr, day and night rainfall, Oct–April, are based on: date; pressure at Lydda and difference from other stations; 24 hr. tendency and humidity at Lydda; 900 mb wind vector, height and temperature of 700 mb level at Nicosia. Regression equations formed graphically gave good results. In the second report the representativeness of selected groups of stations is discussed *Subject Headings:* **1. Rainfall forecasting 2. Israel.**—*C.E.P.B.*

CLOUD SEEDING AND ARTIFICIAL PRECIPITATION

4.8–63 551.509.67:551.574.2

Vonnegut, Bernard and Maynard, Kiah (*General Electric Res. Lab., Schenectady, N. Y.*), **Spray-Nozzle type silver-iodide smoke generator for airplane use.** *American Meteorological Society, Bulletin*, 33(10):420–428, Dec. 1952. 13 figs. **MH-BH**—A detailed description of air-borne spray nozzle type silver iodide generator with the aid of schematic diagrams and photographs is presented. It is so designed as to make the apparatus safe and to shield the flame from the air stream. This generator is based upon an atomizing type of spray nozzle. A solution of AgI in acetone and sodium iodide is atomized in the nozzle by means of a compressed inflammable gas such as hydrogen. The spray and gas are ignited and burn as a hot flame on issuing from nozzle; the AgI is vaporized and then condensed as very fine particles. The installation of this generator and its application in seeding of cumulus clouds are described. *Subject Heading:* **1. Silver iodide smoke generators.**—*I.L.D.*

4.8–64 551.509.67

American Institute of Aerological Research, Denver, Colo., **A report on cloud-seeding potentialities in Central Cuba. American Sugar Refining Company, Cunagua & Jaronu.** *American Institute of Aerological Research, Denver, Report*, No. 70, March 25, 1952. 23 p. 2 tables, 7 figs., 4 refs. **DLC**—A preliminary survey of climatic, orographic and other factors to be considered in planning cloud seeding operations for the benefit of the American Sugar Refining Corporation plantations in central Cuba. Relationship of rainfall (May–Oct.) to harvested cane, as shown in scatter diagrams, indicates 529–588 additional "arrobas per cab" for each additional inch of rain (range 25–50") at Cunagua and Jarome, respectively. The

asic cloud, precipitation, wind and weather patterns over Cuba are discussed. May through ct. is recommended as most suitable season for ground AgI and occasional airplane seeding. outine pilot balloon ascents and weather forecasts are required. Sites for most favorable ocation of generators are indicated. Motion picture cameras are needed for proving effectiveess. Seeding should be suspended during hurricanes. *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding 3. Cuba. I. Water Resources Development Corporation.**—*M.R.*

4.8–65 551.509.67

Birstein, S. J. (*U. S. Air Force. Cambridge Res. Ctr., Mass.*), **The effect of relative umidity on the nucleating properties of photolyzed silver iodide.** *American Meteorological ociety, Bulletin*, 33(10):431–434, Dec. **1952.** 2 figs., table, 10 refs. **MH-BH**—Laboratory xperiments on the effect of relative humidity or absorbed water vapor upon the photolysis nd nucleating ability of AgI particles. In order to produce various degrees of relative umidity known amounts of water vapor are introduced into a stream of nitrogen passing ver a silver iodide generator. The particles ranging 0.004 to 0.4 microns were irradiated by V for varying duration and injected into a cloud of supercooled water droplets. The results f experiments with varying degrees of relative humidity indicated that increasing relative umidity raises the resistance of AgI to destruction by UV light. A possible mechanism or the phenomenon is discussed. *Subject Headings:* **1. Artificial precipitation 2. Cloud eeding with silver iodide 3. Cloud physics 4. Silver iodide properties.**—*I.L.D.*

4.8–66 551.509.67(046)

Bowen, David, **Weather control has become a science.** *Daily Telegraph*, London, lo. 30,444:6, Jan. 31, **1953.**—Popular article on methods of rain-making by cloud seeding and ommercial possibilities. National and international control are needed. *Subject Headings:* **Artificial precipitation 2. Newspaper articles.**—*C.E.P.B.*

4.8–67 551.509.67(789)

Buell, C. E. (*Univ. New Mex.*), **Evaluation of cloud seeding effects in northwestern lew Mexico, August, 1951.** New Mexico. University. Contract Cwb-8161, Cooperative tudy of Cloud Seeding Effects Project, Progress Report, May 24, **1952.** 16 p. 6 tables, efs., eqs. **DWB**—Since extensive practice of cloud seeding activities precludes the use of a control area" in statistical comparative evaluation of cloud seeding results, the method used n the project reported was based on a linear relation which was found to exist between the uantity of expected rainfall and a combined quantity of mixing ratios at the 700 mb and 00 mb levels and the temperature difference between these same levels. Expressions repreenting this correlation are applied to data obtained in Aug. 1951 and compared with the same elation for Aug. 1944–1947. Results are found to indicate that the amount of data analyzed s not sufficient to show significant changes due to cloud seeding activities. Better results are xpected, however, from more extensive data which will be evaluated in the future. *Subject leadings:* **1. Cloud seeding 2. Mixing ratios 3. Upper air temperatures 4. Correlations. New Mexico. University II. U. S. Weather Bureau III. Contract Cwb-8161.**—*G.T.*

4.8–68 551.509.67

Davies, D. A. (*E. African Met. Service*), **Artificial stimulation of rainfall.** *South African Journal of Science*, Johannesburg, 49(2):45–48, Sept. **1952. DWB**—After a general survey of heoretical and experimental progress in cloud seeding, the author describes the experiments onducted at Kongwa, Tanganyika during the period Jan.–April 1951. In these experiments he "balloon-bomb" technique was applied, which involves the launching of hydrogen balloons arrying small charges of gunpowder impregnated with AgI. A time fuse causes the gunowder to explode at an altitude of about 15,000 ft above mean sea level. By this method, the uthor explains, the seeding material is carried directly into the cloud, which is one of the dvantages over the ground-generator technique. Effects of the seeding were observed over network of 50 rain gages distributed on 200 sq mi. Out of 27 days when successful operations ere expected, 12 were "probably unsuccessful," 10 "inconclusive" and only 5 "probably uccessful." The analysis of total rainfall data and their comparison with data from surroundng unseeded areas showed equally poor results. Further experiments with the "balloon-

bomb" are in progress. (*See also items* 3.5–97 and 3.8–68, May, Aug. 1952, *MAB.*) *Subject Headings:* **1. Artificial precipitation 2. Balloon bomb technique 3. Cloud seeding evaluation 4. Kongwa, Tanganyika.**—*G.T.*

4.8–69 551.509.6

Dessens, Henry (*Puy-de-Dôme Obs.*), **Étude de quelques tentatives pour provoquer la pluie ou éviter la grêle.** [Study of some efforts to cause rain or to prevent hail.] *Société des Sciences Naturelles du Maroc, Comptes Rendus des Séances Mensuelles,* No. 3:71–72, 1952. Stamped on t-p: *Puy-de-Dôme. Observatoire, Publications, Série B,* No. 5, **1952.** Abstracted from reprint. **DWB**—Note on cloud studies and rain making experiments conducted at Puy-de-Dôme Observatory. The note is based on a lecture delivered at a meeting of the Society of Natural Sciences of Morocco at Casablanca on March 7, 1952. The author compares the present state of the science of rain making to that of broadcasting in 1900. Chief difficulty is the lack of conclusive control methods. At the Observatory extensive use is made of photometric control techniques. Silver iodide cloud seeding experiments conducted so far appear to have had noticeable effects. A planned set-up of 20 generators is announced for hail prevention experiments to be conducted in 1952. *Subject Headings:* **1. Artificial precipitation 2. Hail prevention.**—*G.T.*

4.8–70 551.509.6

Rosenan, N. (*Israel Met. Service*), **A climatological analysis of cloud seeding experiments during the rainfall year 1950–51 in Israel.** Hakirya, Israel, Rainfall Research Committee, Aug. **1952.** 4 p. table, diagr. Mimeographed. **DWB**—During the year 1950–51, 18 attempts were made to seed clouds with AgI smoke generated at the ground at Aeftsibah, Israel. The results were assessed by means of rainfall charts drawn on each of these 18 days, and comparison with random days where no seeding occurred. It appeared that on at least 6 occasions some increases occurred downwind from the generator, which did not occur normally. Frequency analysis also shows a concentration of anomalous (increase) precipitation on seeding days. However, there is considerable variation in occurrence of precipitation on the 18 days seeding was carried out. *Subject Headings:* **1. Cloud seeding with silver iodide 2. Cloud seeding evaluation 3. Rainfall frequencies 4. Israel.**—*M.R.*

4.7–71 551.509.67

Thom, Herbert C. S. (*Climat. Div., U. S. W. B., Wash., D. C.*), **The evaluation of cloud seeding operations.** Paper presented at CBIAC Meeting at Portland, Oregon, Feb. 20, 1952. 6 p. 2 figs. Typescript. **DWB**—The methodological difficulties encountered in obtaining sensitive evaluation of attempts to increase precipitation by cloud seeding are discussed in nontechnical language. The target-control area experiment involves a procedure in which the effect of seeding is compared with concurrent records over an area expected to have related amounts of precipitation. The normal precipitation to be expected on the target in relation to that received on the control depends upon the amount received on the control. The target-control area technique of evaluation is illustrated by means of a diagram and discussed in detail. *Subject Headings:* **1. Cloud seeding 2. Cloud seeding evaluation.**—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

See also: **Photochemical processes in upper atmos.** (Chapman), 4.8–5; **Physics of high atmos.** (Gerson), 4.8–10; **Night-sky radiation, upper atmos.** (Hulburt), 4.8–11; **Upper atmos.** (Mitra), 4.8–15; **Constant balloon project** (N. Y. Univ.), 4.8–48; **Global stratospheric air circulation and mechanism of tropopause level change** (Goldie), 4.8–98.

4.8–72 551.510.3

Ashburn, Edward V. (*U. S. Naval Ord. Test Station, Inyokern, Calif.*), **The measurement of the density of the atmosphere by the searchlight technique.** *Journal of Geophysical Research,* 58(1):116–117, March **1953.** foot refs. **DWB**—It is suggested that the scattered

ight from a searchlight can most easily be distinguished from the night sky background light by taking advantage of the fact that the light scattered from a searchlight beam is polarized. Further, if a blue filter is used the stronger air glow emission lines are blocked out and the contrast between the night sky and searchlight should be stronger. *Subject Headings:* **1. Air density 2. Searchlight technique.**—*Author's abstract.*

4.8–73 551.510.3

Elterman, Louis, **The measurement of stratospheric density distribution with the searchlight technique.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers,* No. 10, Dec. **1951.** 48 p. 30 figs., 6 tables, 12 refs. Also in: *Journal of Geophysical Research,* 56(4):509–520, Dec. **1951.** 4 figs., table, 9 refs., 10 eqs. Kaplan, Lewis D., **Some comments on L. Elterman's "The measurement of stratospheric density distribution with the searchlight technique."** *Ibid.,* 57(3):426–427, Sept. **1952.** tables, 3 refs. Elterman, L., **A reply to Lewis D. Kaplan's comments on density measurements with the searchlight technique.** *Ibid.,* p. 427–429. ref. **DWB**—Light scattering from a beam, modulated by shutter mechanism and projected into the atmosphere investigated. Sensing device: 60" parabolic mirror and photo-multiplier tube. Values of atmospheric density obtained assuming Rayleigh scattering and matching response at 15 km with radiosonde measurements at that height. Author discusses theory of measurements, gives technical details and presents data from 8 series of observations up to 62 km. Good agreement with Rand atmosphere. Slight seasonal variations. In the comment by KAPLAN, he suggests that impossible pressures and temperatures obtained by extrapolating ELTERMAN's curves with a trapezoidal rule make any conclusions regarding seasonal variation of density in the region above 20 km unjustified. LOUIS ELTERMAN in reply to comment by KAPLAN states that he did not intend to have his techniques, which are merely exploratory subjected to rigid quantitative evaluation at this stage—he merely wanted to show that the method permitted the first successful measurement of light scattered by a beam to a height of 68 km. Further refinements should eliminate some of the difficulties and inaccuracies. *Subject Headings:* **1. Stratospheric density 2. Searchlight technique 3. Stratospheric scattering.**—*A.A., M.R.*

4.8–74 551.510.534:546.214

Kawamura, Kiyoshi, **A preliminary study on the photo-electrical method of measuring the atmospheric ozone.** *Tateno, Japan. Aerological Observatory, Journal,* 5(1):76–82, March **1951.** 4 figs., table, 4 refs. English summary p. 76. **DWB**—The author applied the method of R. STAIR (*Nat. Bur. of Standards, Journal of Res.,* 40(9), 1948) in order to determine the amount of ozone using the changes in the percentage transmittance of filters which were obtained by measuring the direct sunlight with a photoelectric cell and filters. The observed result was about 0.17 cm for normal pressure and temperature, an amount that seems too small. *Subject Headings:* **1. Ozone measurement techniques 2. Photoelectric cells.**—*A.A.*

4.8–75 551.510.41:551.521.11(771):678.15

Popp, George E. and Harbison, Lynn (*Phillips Chemical Co., Akron, Ohio*), **Ozone and sunlight effect on aging of carbon black vulcanizates.** *Industrial and Engineering Chemistry,* 44(4):837–840, April 2, **1952.** 12 figs., 2 tables, 6 refs. **DLC**—This study was initiated to determine the effects, if any, of individual types of carbon blacks on checking and ozone cracking of natural and synthetic rubber under static testing conditions. Specimens were exposed to sunlight aging in Akron, Ohio, during April and May of 1950 under 12½% strain, and an additional series of specimens were simultaneously tested with a 180 degree bend. The results show that carbon blacks, regardless of type, particle size, structure, and physical properties imparted, do not affect the rate or degree of cracking in the polymers studied upon exposure to either sunlight or ozone when under static stress. *Subject Headings:* **1. Ozone effects 2. Sunlight effects 3. Akron, Ohio.**—*From authors' abstract.*

4.8–76 551.510.53:551.521

Kondrat'ev, K. IA., **Teplovoĭ rezhim stratosfery.** [Thermal regime of the stratosphere.] *Priroda,* Moscow, 41(7):62–68, July **1952.** 5 figs., 2 tables, 4 refs. **DLC**—A concise and

comprehensive review of the latest experimental data and theoretical concepts dealing with the thermal regime of the stratosphere, based upon Soviet and foreign literature. The discussion covers the variation of stratospheric temperature with latitude, the annual variations of stratospheric temperature isothermy, the radiational balance in the troposphere and stratosphere, ozone and moisture content of the stratosphere as factors in radiation absorption (DOBSON), investigations of GOODY on total radiational balance in stratosphere, the radiational balance of individual wave lengths (STRONG and PLASS) and turbulent exchange in the stratosphere. *Subject Headings:* **1. Temperature of the stratosphere 2. Radiation balance 3. Turbulent exchange.**—*I.L.D.*

4.8–77 551.510.53

Singer, S. F., **Physics of the high atmosphere.** *Nature*, London, 171(4343):146–148, Jan. 24, **1953.** 5 refs. **DWB**—Report of discussion at British Association, Sept. 5, 1952. F. E. ROACH described research on night airglow. W. R. PIGGOTT discussed special results from ionospheric reflection data (tidal oscillations, electron density), S. F. SINGER discussed shortcomings and future possibilities of high-altitude sounding rockets. Finally, D. R. BATES considered problems of temperature of exosphere. SINGER points out that "the overall impression gained from these talks is that many of the fundamental features which affect the atmosphere are at present either unknown or roughly inferred," e.g., UV and X-ray solar spectra. *Subject Headings:* **1. Upper atmosphere research. I. Roach, F. E. II. Piggott, W. R. III. Bates, D. R.**—*C.E.P.B.*

4.8–78 551.510.534:546.214

Dobson, G. M. B., **Ozone in the earth's atmosphere.** *Endeavour*, London, 11(44):215–219, Oct. **1952.** 4 figs., 6 eqs. **DWB**—A concise and nontechnical discussion of the meteorological significance of ozone, the probable process of ozone formation in the upper atmosphere, the methods of measuring the amount of ozone in the atmosphere, its vertical distribution in the atmosphere, its general distribution over the world, its variations under the influence of weather and its presence in the lower atmosphere. *Subject Headings:* **1. Ozone distribution 2. Ozone measurement techniques 3. Ozone variations.**—*I.L.D.*

4.8–79 551.510.534:546.214

Johnson, F. S., Purcell, J. D. and Tousey, R., **Measurement of the vertical distribution of atmospheric ozone from rockets.** *Journal of Geophysical Research*, 56(4):583–594, Dec. **1951.** 6 figs., 2 tables, 11 refs. **DWB**—The UV spectrum of the sun was photographed by small automatic spectrographs. Data for the vertical distribution of ozone given for two days. No ozone was found above 45 km, the maximum concentration was between 18 and 24 km. Maximum concentration relative to air was at about 28 km height. *Subject Headings:* **1. Ozone distribution 2. Rocket soundings 3. White Sands Proving Ground, New Mexico.**—*A.A.*

4.8–80 551.510.534

Dütsch, H. U., **Das Ozon in der Erdatmosphäre. Vorkommen und Bedeutung.** [The ozone in the earth's atmosphere. Occurrence and importance.] *Umschau*, 53(7):195–197, April 1, **1953.** 5 figs. **DLC**—Summary of selective absorption by O_3, distribution by latitude and months, vertical distribution, relation to young depressions and to anticyclones. Processes of formation and destruction are described, relation to solar eruptions and possible use in long range forecasting mentioned. *Subject Heading:* **1. Ozone layer.**—*C.E.P.B.*

4.8–81 551.510.534:551.547

Normand, Sir Charles, **Atmospheric ozone and the upper-air conditions.** *Royal Meteorological Society, Quarterly Journal*, 79(339):39–50, Jan. **1953.** 12 figs., 19 refs. **DWB**—Presidential address. Daily measurements of ozone layer above Oxford are compared with 500–300 mb thickness and height of tropopause (both reversed). Relations to source of air in long wave oscillations are illustrated by 300 mb contours on days of high and low ozone content. Seasonal and latitude distribution of ozone and its vertical distribution are discussed in relation to advection and vertical divergence or convergence. Methods of survey are described, including Umkehr method. *Subject Heading:* **1. Ozone variations.**—*C.E.P.B.*

4.8–82 551.510.534

Paetzold, Hans-Karl, **The mean vertical ozone distribution resulting from the photochemical equilibrium, turbulence and currents of air.** *Journal of Atmospheric and Terrestrial Physics*, 3(3):125–131, April 1953. 6 figs., 2 tables, 23 refs. **MH-BH**—Vertical distribution and amount of ozone are calculated on four assumptions of solar radiation of 2100 Å and spectral pressure coefficient of absorption by O_2. The average distribution is best fitted by ratio solar radiation black body at 2100 Å = 0.03 and O_2 absorption proportional to $p^{1.4}$, and by downward transport of ozone by turbulent exchange, greatest at the equator. Double maximum sometimes found is attributed to accumulation in Arctic air masses which drift S losing height. *Subject Heading:* **1. Ozone distribution.**—*C.E.P.B.*

4.8–83 551.510.534:546.214

†Regener, Victor H. (*Univ. of New Mexico*), **Atmospheric ozone.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, 1952. p. 109–122. 3 figs., 50 refs.) **DLC**—A concise summary reviewing the literature on the total amount of atmospheric ozone, the vertical distribution of ozone, the absorption of UV sunlight by ozone, the toxic and chemical effects of atmospheric ozone and the transport of ozone between stratosphere and troposphere. Graphs showing the vertical distribution of atmospheric ozone over New Mexico, ozone recordings on the earth's surface and various physical characteristics of the atmosphere due to ozone such as ratio of number of ozone molecules to air molecules, amount of UV sunlight penetrating each altitude, etc., and an extensive bibliography are included. *Subject Headings:* **1. Ozone 2. Ozone distribution 3. Ultraviolet absorption.**—*I.L.D.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Dynamic meteorology** (Logvinov), 4.8–13; **Absolute vorticity charts** (Cressman), 4.8–59; **Necessary condition for development of convection in atmos. friction layer near ground** (Frankenberger), 4.8–145; **Micrometeorological conditions over snow pack in open forest** (Miller), 4.8–238.

4.8–84 551.511

Batchelor, G. K., **The conditions for dynamical similarity of motions of a frictionless perfect-gas atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 79(340):224–235, April 1953. 5 refs., 32 eqs. **DWB**—The object of this paper is to show, in an elementary way, the general significance of the Richardson number for motions of a frictionless perfect gas of variable density subject to gravity. Dimensionless parameters like the Richardson number are important in relation to the concept of dynamical similarity of flow fields, and as a consequence the paper consists largely of discussions of the conditions for dynamical similarity of flow fields of specified kind. It is established that if the flow fields are such that the pressure and density everywhere depart by small fractional amounts only from the values for an equivalent atmosphere in adiabatic equilibrium and if the vertical length scale of the velocity distribution is small compared with the scale height of the atmosphere, the Richardson number is the sole parameter governing dynamical similarity. Various possible forms of the Richardson number are examined. *Subject Heading:* **1. Mechanics of the atmosphere.**—*Author's abstract.*

4.8–85 551.511

James, R. W. (*West Byfleet, Surrey, Eng.*), **A thermal cycle in the atmosphere.** *Geofisica Pura e Applicata*, 23:111–123, 1952. fig., 7 refs. **MH-BH**—Author shows by means of BJERKNES' circulation theorem and additional considerations that a steady state is achieved when the rate of circulation change due to baroclinity is just balanced by that due to friction. In order to preserve this steady state, a specific distribution of sources of heat (cyclones) and sinks (anticyclones) is required. Author defines hypo- and hyperthermal stratification, direct and indirect, work consuming and work producing circulation. Results verified for individual cumulus clouds up to large scale monsoonal systems. *Subject Headings:* **1. General circulation theory 2. Heat sources and sinks 3. Atmospheric circulation.**—*A.A.*

4.8–86 551.511:533

Neis, Bernhard, **Grosswetter und theoretische Physik.** [General weather and theoretical physics.] *Naturwissenschaftliche Rundschau*, 6(3):108–111, March **1953.** 9 refs., 3 eqs. **DWB**—In this philosophical essay author introduces laws of transformation of energy and principle of least action into the dynamics of large scale atmospheric transformations. Changes of kinetic energy have a definite rhythm, due to seasonal and diurnal changes, which takes effect in whirls on a cyclonic scale and also as gravity waves which travel long distances with nearly the speed of sound. Their interference, aided by condensation, causes large scale changes of pressure and temperature in the upper air. The period of such changes is commensurate with changes of weather type. The future expression of these ideas as differential equations, and their solution, is discussed. *Subject Headings:* **1. Mechanics of the atmosphere 2. Energy transformation.**—*C.E.P.B.*

4.8–87 551.511:551.509.312

†Bolin, Bert and Charney, Jule (*Princeton, Inst. for Advanced Study*), **Numerical tendency computations from the barotropic vorticity equation.** *Tellus*, 3(4):248–257, Nov. **1951.** 8 figs., refs., 4 eqs. **MH-BH**—Test computations made for a period of ten days in order to verify usefulness of numerical forecasting. Computational errors discussed. Correlation up to 0.70. Best results in the region of the Great Lakes. Influence of Rocky Mountains on the scale upper level flow pattern discussed. *Subject Headings:* **1. Numerical forecasting 2. Vorticity equations 3. United States.**—*A.A.*

4.8–88 551.511:551.513.1

Van Mieghem, J. (*Brussels Univ.*), **Le bilan de la rotationnelle absolue dans l'atmosphère.** [Balance of the absolute vorticity in the atmosphere.] *Tellus*, 3(4):297–300, Nov. **1951.** 2 refs., 10 eqs. English summary p. 297. **MH-BH** -The equation of balance of the absolute vorticity is derived from V. BJERKNES' circulation theorem, formulated in an arbitrary moving frame of general coordinates. The flux and the rate of production of absolute vorticity are defined. The case of the component of absolute vorticity normal to the equiscalar surfaces of a meteorological quantity is considered. From the expression of the horizontal convective flux of the vertical component of the relative vorticity, a relation between the horizontal meridional flows of relative vorticity and angular momentum is deduced. *Subject Headings:* **1. Vorticity balance 2. Angular momentum 3. Atmospheric circulation.**—*Author's abstract.*

4.8–89 551.511:551.513.2:551.557

Queney, Paul (*Univ. of Paris*), **Les ondes atmosphériques considérées comme associées aux discontinuités du tourbillon.** [Atmospheric waves associated with vorticity discontinuities.] *Tellus*, 4(2):88–111, May **1952.** 10 figs., table, 10 refs., 62 eqs. English summary p. 88–89. **MH-BH**—A remarkably thorough theoretical treatment of the problems of long waves and cyclone waves in an ideal atmosphere with one or two jet streams (two or three zonal currents) at about 12 km. The work of HAURWITZ, PLATZMAN, KUO and ROSSBY and applications of CRESSMAN are reviewed. It is pointed out that cyclogenesis is not produced by interaction of two air masses with differing temperatures but by action between a mass of cold air and warm earth or sea surface. The logical development begins with the assumption of horizontal, non-divergent motion where, with constant ζ the simple equation $\Delta^2\psi = 0$ where ψ is the local disturbance of the stream function. In Chap. III the author derives the equation for the horizontal waves (in the absence of viscosity), first for the simple jet and then for the double jet. Four special cases are derived and illustrated diagrammatically. Next, the effect of viscosity is introduced and the conclusion reached that on unstable waves with a quasi-simple jet the viscosity effect is practically negligible. In Chap. V application is made to the semi-permanent centers of action. Agreement with ROSSBY theory is good for the case of the simple jet, but for the double jet agreement is not good. In the final chapter a theory of cyclone waves is proposed and it is suggested that this theory would apply to tropical cyclones and easterly waves in cases where the jet stream penetrates into a monsoon area. The importance of this paper cannot be transmitted in the form of an abstract—it is recommended that the paper itself be read to be properly evaluated. (*Same item as* 4G–112, July 1953, *MAB.*)

Subject Headings: **1. Waves in the westerlies 2. Cyclogenesis 3. Jet stream 4. Cyclone waves.**—*M.R.*

4.8–90 551.511:551.524.4:551.554

Jehn, K. H. and Gerhardt, John R., **Surface atmospheric heat-flux analysis on the Lettau model.** *Journal of Meteorology*, 10(1):10–16, Feb. **1953.** 7 figs., 5 refs., 7 eqs. **MH-BH**—Turbulent heat fluxes in T_m air at Manor, Texas, Jan. 24–25, 1950, from vertical gradients of temperature and wind up to 181 ft, and from net radiation at surface and heat interchange in soil, are plotted and discussed on basis of H. LETTAU's 1949 analysis. They show small negative heat transfer at night and positive values by day; mean afternoon maximum 0.15 cal/cm²/min but flux on clear and overcast days is estimated from large range of individual readings. Other analyses are compared. A discrepancy between values from wind and temperature profiles may be due to too large a figure for LETTAU's *K*. *Subject Headings:* **1. Heat exchange 2. Vertical temperature gradient 3. Wind profiles. I. Lettau, H.**—*C.E.P.B.*

4.8–91 551.511:551.551

Cramer, Harrison E., **A new approach to the problem of turbulent mixing.** *Journal of Meteorology*, 10(1):46–53, Feb. **1953.** 9 figs., table, 7 refs., 19 eqs. **MH-BH**—Turbulent flow is regarded as involving dynamic entrainment and an expression is derived for mass exchange between relatively moving fluid and its environment. An aerosol plume formed by continuous emission from a high point source is divided into 3 stages of +, −, + acceleration; in the first and third an aerosol "plate" increases in thickness, in the second in diameter. This illustration is developed into models from which the effects on plume diameter and aerosol concentration are calculated. It is found that turbulent mixing depends on the scale of velocity fluctuations and its relation to mean wind speed. *Subject Heading:* **1. Turbulent mixing.**—*C.E.P.B.*

4.8–92 551.511:551.558

Watanabe, T., **Vertical stability and development of vertical current.** *Tateno, Japan. Aerological Observatory, Journal*, 5(1):32–36, March **1951.** 2 figs., maps, eqs. English summary p. 32. **DWB**—The author discussed the following criterion for the development of a vertical current $-g\frac{\partial \rho}{dr} < \rho\lambda\frac{\partial v_\theta}{\partial z}$; g = earth acceleration; $\frac{\partial \rho}{dr}$ = horizontal density gradient; λ = Coriolis factor, $\frac{\partial v_\theta}{\partial z}$ = vertical wind shear. Decay occurs if the left side is greater than the right. This factor should be important for dynamical cyclogenesis. *Subject Headings:* **1. Vertical currents 2. Cyclogenesis.**—*A.A.*

4.8–93 551.511:551.558.1

Ray Choudhuri, S. N., **On thermodynamics of downdrafts.** *Indian Journal of Meteorology and Geophysics*, Delhi, 3(1):49–52, Jan. **1952.** 2 figs., 4 refs. **MH-BH**—The thermodynamic properties of downdrafts as analyzed by the parcel method of KAPLAN and the entrainment and mixing method of BYERS and BRAHAM are discussed in detail. The author concludes that the treatment by the latter method is more in accord with the factual evidence but that the difference between the two approaches is quantitative rather than qualitative. *Subject Headings:* **1. Thermodynamics of the atmosphere 2. Vertical currents.**—*I.L.D.*

4.8–94 551.511:551.558.1

Rouse, Hunter; Yih, C. S. and Humphreys, H. W. (*Iowa Inst. of Hydraulic Research*), **Gravitational convection from a boundary source.** *Tellus*, 4(3):201–210, Aug. **1952.** 5 figs., 28 eqs. **MH-BH**—Elementary analyses of the mean patterns of free convection from a line source and a point source are presented without regard to the specific means by which the gravitational action is produced. The derived functional relationships are then verified and completed through use of velocity and temperature measurements above sources of heat, the generalized form of the results permitting characteristics of the mean flow to be determined over a considerable range of the primary variables. These results should enable meteorologists

to evaluate the role of the basic convective process in the more complex movements of the atmosphere. *Subject Headings:* **1. Convection 2. Convection currents.**—*Authors' abstract.*

4.8–95 551.511:551.558.29

White, Robert M. and Cooley, Duane S. (*Geophysical Res. Div., Cambridge, Mass.*), **The large-scale vertical eddy stress in the free atmosphere.** *American Geophysical Union, Transactions*, 33(4):502–506, Aug. 1952. fig., table, 10 refs., 6 eqs. **MH-BH**—A modified form of the advective formula developed by PANOFSKY to compute vertical movement in the atmosphere is used to determine "the order of magnitude of the large scale vertical eddy flux of angular momentum in the free atmosphere for the middle latitude region 30°N to 60°N." The vertical eddy and flux of relative angular momentum through the 500 mb level was computed from 24-hour averages of the zonal and vertical components of velocity at 72 points around a given latitude circle, and the numerical analysis of the data is presented both tabularly and graphically. The results indicate "that the large-scale vertical eddy flux associated with migratory cyclones and anticyclones can act as an effective mechanism in bringing about the required downward flux of angular momentum." *Subject Headings:* **1. Vertical eddy flux 2. Angular momentum 3. Vertical motion. I. Panofsky, H.**—*I.L.D.*

GENERAL CIRCULATION

See also: **Atmos. circulation** (Bolin), 4.8–3; **Absolute vorticity balance in atmos.** (Van Mieghem), 4.8–88; **Atmos. waves and vorticity discontinuities** (Queney), 4.8–89; **Atmos. reactions to solar corpuscular emissions** (Willett), 4.8–123; **Eddy formation by lateral shear** (Hubert), 4.8–146.

4.8–96 551.513.1

Arakawa, Hidetoshi, **Tilted-trough model as an interaction between low- and high-latitude disturbances.** *Journal of Meteorology*, 10(1):64–66, Feb. 1953. fig., 6 refs., 9 eqs. **MH-BH** ROSSBY's model of atmospheric motions is modified by tilting trough and ridge lines in a basic zonal flow varying sinusoidally with latitude. Coupling of tilted trough in easterlies with southern extensions of a tilted trough in polar upper westerlies is suggested. *Subject Headings:* **1. Global circulation 2. Meridional exchange.** *-C.E.P.B.*

4.8–97 551.513.1

Berson, F. A., **A quantitative analysis of the evolution of large-scale flow with regard to the effect of eddy motion.** *Royal Meteorological Society, Quarterly Journal*, 79(340):210–223, April 1953. 5 figs., 4 tables, 12 refs., 14 eqs. **DWB**—The smoothing inherent in synoptic maps suppresses fluctuations of the scale of gravity waves and some convection cells. This eddy component is studied as the fluctuation of synoptically smoothed values about running 5-day means. The theory is applied to nearly zonal 500 mb flow over N. America with large blocked vortices downstream (June–July 1949) and a possible forecasting technique is deduced. No evidence is found for standing perturbations due to mountain ranges. The eddy transfer coefficient K is mainly negative $10^9 - 10^{10}$ cm^2-sec and this on a cyclone-wave scale helps to maintain larger eddies. *Subject Headings:* **1. Atmospheric circulation 2. Vorticity.**—*C.E.P.B.*

4.8–98 551.513.1:551.510.53

Goldie, Archibald H. R., **The global circulation of stratosphere air and the mechanism of change of tropopause level.** *Great Britain. Meteorological Research Committee, M. R. P.* 734 (rev. Dec. 1952). 6 p. 6 figs., 4 refs. Mimeographed. **DWB**—Jan. and July temperatures and potential temperatures, 500–90 mb at Larkhill are plotted in relation to tropopause pressures and to tropopause at equator. The marked discontinuity at tropopause is attributed to slow air flow towards equator below and from equator above it. Steepness of the fall of potential temperature in latter current while descending 11,000 ft points to a continual loss of heat, 67% of adiabatic gain in Jan. and 52% in July being lost by radiation. This requires 3–4 weeks. Polar minima require loss of all or more of adiabatic gain. More rapid displacements of tropopause require convergence and vertical motion; the mechanism is discussed with examples. *Subject Headings:* **1. Global circulation 2. Temperature of the stratosphere 3. Tropopause formation.**—*C.E.P.B.*

4.8–99 551.513.1:551.551

Arakawa, Hidetoshi, **Possible heavy turbulent exchange between the extratropical tropospheric air and the polar stratospheric air.** *Tellus*, 3(3):208–211, Aug. **1951.** 2 figs., 11 refs., 10 eqs. **MH-BH**—The criterion for the development of heavy (horizontal) turbulence in zonal motion which deviates widely from the well-known criterion of dynamic stability is defined mathematically and expressed verbally, namely: if the anticyclonic wind shear is greater than the critical anticyclone shear given by the condition of zero absolute vorticity, the zonal motion is dynamically unstable; and if the wind shear is greater than a proper critical cyclonic shear, heavy dynamic turbulence results. The wind shear reaches the critical cyclonic value in a narrow zone just north of the latitude of the jet stream. Therefore there must be a zone of heavy turbulent exchange of air masses between the extratropical tropospheric air and the stratospheric air through the slit between the extratropical and polar tropopauses. *Subject Headings:* **1. Atmospheric circulation 2. Turbulent exchange 3. Jet stream 4. Wind shear.**—*From author's abstract.*

4.8–100 551.513.1:551.555.1

Flohn, Hermann, **Die Revision der Lehre vom Passatkreislauf.** [Revision of the theory of the trade wind circulation.] *Meteorologische Rundschau*, 6(1/2):1–6, Jan./Feb. **1953.** 3 figs., table, 32 refs. **DWB**—The modern 3-dimensional theory bases the trade wind on horizontal exchange with the westerly drift, which feeds the sub-tropical anticyclonic cells. These maintain a quasigeostrophic tropical easterly "Urpassat" (primary trade), the shallow surface component of which is deflected towards the equator by friction. Above this is a weak return current, but the classical counter-trade does not exist. Stability and dryness of the trades, resulting from divergence of the equatorward winds, contrast with convergence, lability and increasing humidity of the poleward tropical monsoons. *Subject Headings:* **1. Atmospheric circulation 2. Trade winds.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

See also: **Atmos: circulation** (Bolin), 4.8–3; **Tornadoes, U. S.** (Flora), 4.8–8; **Tornado forecasting, Kan., Nebr.** (Shuman, Carstensen), 4.8–61; **Barograph record of deep depressions** (Lawrence), 4.8–141; **Clouds in middle of typhoon** (Simpson), 4.8–184; **Rheumatism and fronts** (Whiten), 4.8–251.

4.8–101 551.515.2(52)

Arakawa, Hidetoshi (*Met. Res. Inst.*), **Mame-Taifu and midget typhoon.** *Geophysical Magazine*, Tokyo, 23(4):463–474, May **1952.** 6 figs., 7 refs. **MH-BH**—The mame-taifu is a small storm of typhoon intensity. The vertical structure of small storms is discussed with the aid of aerological soundings (presented graphically) made during the storms of Aug. 1950 off Japan. The characteristics of subtropical cyclones in the Northwest Pacific are generally very small storms as compared with the normal typhoon, and the subtropical cyclone may develop into the mame-taifu. *Subject Headings:* **1. Subtropical cyclones 2. Japan.**—*I.L.D.*

4.8–102 551.515.2:415.495.1

Gherzi, E., **Derivation of the word 'typhoon.'** *Weather*, 8(5):144–145, May **1953.** fig., 7 refs. **MH-BH**—States that "typhoon" is a confusion between Chinese TA-FENG (high winds) and THAI-FENG (womb of winds from all quarters). The latter, or the Cantonese form THAI-FUNG, is the Chinese term for typhoon. *Subject Headings:* **1. Typhoons 2. Chinese language 3. Etymology.**—*C.E.P.B.*

4.8–103 551.515.2:551.46

Huckins, H. G. U., **Typhoon 'Dinah.'** *Weather*, 8(3):95, March **1953.** **DWB**—Account of "tidal wave" 100 ft high in rear of typhoon north of Formosa, June 23, 1952. *Subject Headings:* **1. Typhoon waves 2. Typhoon "Dinah" (1952).**—*C.E.P.B.*

4.8–104 551.515.23(52)

Sakai, H., **On the path of typhoon (2nd report).** *Journal of Meteorological Research*, Tokyo, 5(5):169–171, Aug. **1952.** 6 figs. In Japanese, English summary p. (13). **MH-BH**—

The author investigates the paths of typhoons in respect to their proximity to Japan and reaches the following conclusions: 1) in the period from July to Sept., when typhoons come closest to Japan proper, the degree of proximity has its minimum value and it becomes larger in other seasons; 2) the degree of proximity shows periods of 5–7, 19–21, 26–28 and 31–33 years and 3) in the years when the mean path of typhoons shifts toward the southeast, typhoons occur most frequently. *Subject Headings:* **1. Typhoon tracks 2. Japan.**—*From author's abstract.*

4.8–105 **551.515.3**(766)

Asp, M. O., (*U. S. W. B., Oklahoma City, Okla.*), **Tornado characteristics in Oklahoma.** *Monthly Weather Review*, 80(12):241–243, Dec. **1952.** 3 figs., 2 tables, 4 refs. **MH-BH**—Data for diurnal frequency variation given. Maximum frequency late afternoon in April and May. Number of tornadoes during one single hour in the state varies from 1(66%) to 21 (one case). Duration of tornado activity from less than one hour, often only few minutes (>6%) up to 6 hours or more (6%). Statistical data for direction and distance of tornado activity given. *Subject Headings:* **1. Tornado statistics 2. Hourly tornado frequencies 3. Oklahoma.**—*A.A.*

4.8–106 **551.515.3**

Douglas, C. K. M.; Jackson, Graeme C., **The Tibshelf tornado.** *Weather*, 7(10):311–312, 322, Oct. **1952.** 4 refs. **MH-BH**—Referring to account by F. A. BARNES and C. A. M. KING (*Weather*, 7(7):214–220), DOUGLAS discusses tornado and thunderstorm development in relation to fronts and the sea breeze. JACKSON describes weather at Cambridge. *Subject Headings:* **1. Tornadoes 2. Sibthorne, England.**—*C.E.P.B.*

4.8–107 **551.515.3**

†Rossmann, Fritz, (*Met. Inst. Univ. of Munich*), **On the tornadoes.** [1951?] 9 p. 7 figs., 17 refs., eqs. Manuscript. **DWB**—Differential equations are presented for 3 cases of possible wind movement in tornadoes, and the conclusion is drawn that air is descending powerfully, with only slight rotational motion, inside a tornado, but admittedly is rising immediately outside this descending jet. The evidence cited is from literature dating back to 1841, but especially the work of WEGENER (1917) and MÜGGE (1927) who advanced a similar theory. Photographs of tornadoes, schematic diagrams, and nomograms based on the differential formulas are presented in this manuscript treatise. *Subject Headings:* **1. Tornado dynamics 2. Waterspouts.**—*M.R.*

4.8–108 **551.515.3**(43,44)

Rossmann, Fritz, **The tornadoes as a meteorological process.** [1951?] 9 p. 7 figs., 7 refs. Manuscript. **DWB**—With numerous references to early literature regarding tornadoes and waterspouts, the author argues the case for downward motion in such storms, insisting that the depression of the water surface under a waterspout cannot be due to the rotational motion (as the whirl does not stay long enough in one spot to transfer its energy to the water) but to the depressing effect of the powerful jet which is directed downward from the cloud. The differential equation used by the author with respect to dynamics of föhn winds is extended to cover the case of the tornado; charts show distribution of tornadoes in Germany and France. *Subject Headings:* **1. Tornado dynamics 2. Waterspouts 3. Tornado distribution 4. Germany 5. France.**—*M.R.*

4.8–109 **551.515.3**(767)

Tornado funnel observed at 35,000 feet. *American Meteorological Society, Bulletin*, 33(8):350–351, Oct. **1952.** fig. **MH-BH**—A sketch and description "of a tornado which projected from the base of a cumulonimbus overhang reaching 35,000 feet and extended downward to the ground where the violently whirling tube merged into the usual heavy dust-cloud associated with a full fledged tornado." It was "observed from an airplane flying at 20,000 feet southwest bound between Harrison and Fort Smith, Arkansas at 1630 CST on April 3, 1950." *Subject Headings:* **1. Tornado observations 2. Arkansas.**—*I.L.D.*

4.8–110 551.515.3(73):551.556.1

*U. S. Weather Bureau, **Tornado occurrences in the United States.** Prepared by Climatological Service Division. *U. S. Weather Bureau, Technical Paper*, No. 20, Sept. **1952.** 43 p. 4 figs., 13 charts, 5 tables, 7 refs. Price: $.35. **DWB**—Data for some outstanding tornadoes are given for the period 1875–1950. The worst tornado occurred in March 1925, when a total of 689 lives were lost within three hours, almost 2000 persons were injured. Property damage during a single tornado amounted to $22,000,000. More detailed information on number of tornadoes, tornado days, death and damage given since 1916 (arranged by states). Average annual number of tornadoes for U. S.—149 on 66 days with 227 deaths and property damage 13.6 million dollars. Current monthly data (1916–1950) given for the whole U. S., mean monthly data also for each state (maximum in May). Another table summarizes the diurnal variation (maximum 4–6 p.m., minimum 6–8 a.m.). Numerous graphs characterize seasonal and diurnal variation, as well as total for each day of the year. Monthly and annual charts show location and tracks of tornadoes. *Subject Headings:* **1. Tornado data 2. Tornado damage 3. Singularities 4. United States.**—*A.A.*

4.8–111 551.515.327

Fawbush, W. J. and Miller, R. C. (*Tinker Air Force Base, Okla.*), **A mean sounding representative of the tornadic airmass environment.** *American Meteorological Society, Bulletin*, 33(7):303–307, Sept. **1952.** 8 figs., table, 2 refs. **MH-BH**—A mean tornado sounding was constructed on the basis of more than 72 soundings of the air mass considered representative of tornadic air. Data on the mean and extreme moist-layer depth, inversion base, inversion top, zero isotherm and lifting level of free convection for the mean sounding and on the relative humidity of the air mass at various levels are given in a table. The mean sounding is similar to the prerequisite air mass structure for tornadoes determined by SHOWALTER. The typical tornado air mass was found to show a great seasonal variation. Individual cases of typical soundings are analyzed with the aid of diagrams. *Subject Heading:* **1. Tornado dynamics.**—*L.D.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Infrared radiation of night sky** (Krasovskiĭ), 4.8–12; **Spectrographic measurement of UV radiation, Paris** (Lenoble), 4.8–32; **Ozone and sunlight effect . . .** (Popp, Harbison), 4.8–75; **Thermal regime of stratosphere** (Kondrat'ev), 4.8–76; **Temporal and latitudinal temp. distribution** (Hess, Frank), 4.8–125; **Cloudiness, Poland** (Stenz), 4.8–186; **Streaming of charged particles trough magnetic field, aurora theory** (Landseer-Jones), 4.8–283; **Bibliography on radiation bioclimatology,** p. 925–958.

4.8–112 551.521

Dee, R. W. R. and Reesinck, J. J. M. (*Indonesia Met. and Geophysical Serv.*), **Global radiation at Djakarta and Bandung.** *Madjalaj Ilmu Alam Untuk Indonesia* [Indonesian Journal for Natural Science], Bandoeng, Java, 108(3/4):94–96, May/Aug. **1952.** graph, 3 refs. **MH-BH**—Values of daily total sun and sky radiation computed by the classical Ångström formula $I=Q[d+(1-d)R]$ are presented in graphical form for Bandoeng and Djakarta (R=relative duration of sunshine, Q=average daily total of global radiation for days with clear sky, d=constant for transparency of clouds). The scale values computed from daily sunshine duration data of the Royal Magnetical and Meteorological Observatory, Batavia, for the period 1930–1937. In juxtaposition with the two curves a curve of radiation outside the atmosphere is presented for comparison. *Subject Headings:* **1. Solar radiation 2. Sky radiation 3. Djakarta, Indonesia 4. Bandoeng, Java.**—*G.T.*

4.8–113 551.521:551.581(436)

Sauberer, Franz, **Der Strahlungshaushalt eines alpinen Sees.** [The radiation balance of an Alpine lake.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(3):253–274, **1953.** 5 figs., 14 tables, 22 refs. German, English, French summaries p. 253–254. **MH-BH**—The lower Lunz Lake (47°51'N, 15°3'E, area 67.8 ha) lies in a deep valley sur-

rounded by mountains averaging 17° elevation. From maps of possible sunshine duration daily sum of solar radiation is calculated for each month, taking account of cloudiness. Annual global radiation is made up of 50,500 cal-cm² solar and 39,200 sky radiation. Total effective radiation takes account of reflection from water surface (6% June 21, 19% Dec. 22) and of winter ice cover. Back radiation from atmosphere is calculated from temperature and vapor pressure by formula of BOLZ and FALCKENBERG. Finally, outward radiation from water surface leads to estimates of long-wave and total radiation balance in each month, which give an annual total of about 40,000 cal-cm² compared with 30,000 for Lake Sakrow (ALBRECHT). *Subject Headings:* **1. Radiation balance 2. Lakes 3. Austria.**—*C.E.P.B.*

4.8–114 551.521.1(73)

Fritz, Sigmund and MacDonald, Torrence H. (*U.S.W.B., Wash., D. C.*), **Average solar radiation in the United States.** *Heating and Ventilating*, New York, 46(7), 61–64 July 1949. 2 figs., 6 refs., 2 eqs. **MH-BH**—Average daily amounts of solar radiation, *Q*, received on a unit horizontal surface over the United States for each month are presented in the form of isolines on maps. The relationship of *Q* to cloudless day radiation and percent of possible sunshine is given as a linear equation; this is followed by a discussion of use of the equation to supplement values of *Q* obtained by direct measurement. *Subject Headings:* **1. Solar radiation 2. United States.**—*Authors' abstract.*

4.8–115 551.521.1:621.47

Heidt, Lawrence J. and McMillan, Alan F. (*Chemistry Dept., M.I.T.*), **Conversion of sunlight into chemical energy available in storage for man's use.** *Science*, 117(3030):75–76, Jan. 23, **1953.** figs., table, 4 refs. **DWB**—In a water solution of cerous and ceric ions, the authors report, hydrogen gas is produced by the portion of light absorbed by the cerous ions, thereby oxidized to ceric ions, and oxygen gas is formed by the portion of light absorbed by the ceric ions, thereby reduced to cerous ions. This results in a gain in total chemical energy due entirely to the light absorbed. The gas-tight apparatus in which this photochemical process is produced, is described and illustrated. Chemical results of experiments conducted with the apparatus are tabulated. *Subject Heading:* **1. Solar heating.**—*G.T.*

4.8–116 551.521.1:523.78

Karapiperis, Photios P., **Epidrasis tēs merikēs ekleipseōs tou Hēliou (25ēs phebrouariou 1952) epi tēs heliakēs aktinobolias en Athēnais.** [Influence of the partial solar eclipse (of February 25, 1952) on the solar radiation at Athens.] *Akademia Athēnōn, Praktika*, 27:307–312, **1952.** 2 graphs, table. In Greek, English summary p. 312. Abstracted from reprint. **MH-BH**—Curves showing the march of direct and of total solar radiation during the solar eclipse on Feb. 25 and on the two days preceding it are presented. Tabulated values of direct and total radiation obtained without filter and of direct radiation through three different filters are given. Methods of measurement and accompanying meteorological conditions (characterized by a cloudless sky) are described. *Subject Headings:* **1. Solar eclipses 2. Solar radiation 3. Athens, Greece.**—*G.T.*

4.8–117 551.521.1

*Matzke, Horst, **Beiträge zur Kenntnis der Globalstrahlung in Greifswald.** [Contribution to knowledge of global radiation in Greifswald.] *Germany. Deutsche Demokratische Republik, Meteorologischer und Hydrologischer Dienst, Abhandlungen*, No. 16, **1953.** 64 p. 22 figs., 13 tables, 69 refs. **DWB**—Observational methods at Greifswald (54°6′N, 13°23′E) with Robitzsch global radiation recorder are described. Monthly and annual sums 1931–51 are tabulated. Annual variation by pentads is examined for cloudless, overcast and all days. ÅNGSTRÖM's formula is evaluated in the modified form $Q_s = Q_1(0.2 + 0.07\ S)$, Q_1 = global radiation on cloudless days, S = sunshine duration %, which agrees with observed values within 10%. Global radiation is also related to cloud data. Data for other European stations are compared and variation of the constants discussed. Global radiation at Greifswald is analyzed into diffuse sky (43%) and direct solar (57%) radiation on a horizontal surface; the effect of sun height is examined. *Subject Headings:* **1. Global radiation 2. Greifswald, Germany.**—*C.E.P.B.*

4.8–118 551.521.12

Hartmann, Wilhelm, **Die Zunahme der Sonnenstrahlung mit der Höhe im Harz.** [The ıcrease of solar radiation with height in the Harz.] *Germany. Deutscher Wetterdienst in der JS-Zone, Berichte*, No. 42:375–381, **1952.** 4 figs., 8 tables, 5 refs. **DWB**—Comparison of ıdiation at normal incidence at Braunlage (615 m) and Hannover (57 m) gives a change with eight of 3% in summer, 70% in winter, of the value in the plain. Radiation at intermediate eights can be interpolated logarithmically, and even extrapolated to peaks. Turbidity ecreases with height in the Harz except in July and Aug. *Subject Headings:* **1. Solar radiaon 2. Harz Mountains, Germany.**—*C.E.P.B.*

4.8–119 551.521.13

Schüepp, Walter (*Léopoldville, Belgian Congo*), **Zur Definition des Begriffes der Intensität er Sonnenstrahlung.** [The definition of the concept of solar intensity.] *Geofisica Pura e pplicata*, 23:147–150, **1952.** 2 refs. English and Italian summaries p. 147. Reply by Kurt Vegener, *Ibid.*, p. 151–152. **MH-BH**—Author criticizes WEGENER's assumption that the emperature of the receiving surface in actinometers must be considered in order to obtain ue radiation values (*see item* 4.4–126, April 1953, *MAB*). A comprehensive list of WEGENER's efinitions is compared with previous definitions and discrepancies in WEGENER's system re shown (measured values in pyrheliometers and relative radiation meters, influence of air emperature, radiation intensity at low solar height, diurnal course of radiation, color filter easurements, time lag and accuracy of measurements, etc.). Solar constant is 2.09+3%, ot 2.5 cal-min^{-1} cm^{-2}, as assumed by WEGENER, who states in his reply that the list is obvisly useless, because it does not consider the temperature variations of the air and the changing bedo of the atmosphere, as well as the elementary physical variation laws. *Subject Headings:* **Radiation measurements 2. Solar constant. I. Wegener, Kurt.**—*A.A.*

4.8–120 551.521.14

CHeltsov, N. I., **Al'bedo oblakov.** [Albedo of clouds.] *Meteorologiia i Gidrologiia*, o. 6:24–26, **1952.** 3 figs., 5 refs. **DLC**—The author investigated the problem on the basis special observations which were made from an airplane in 1949 over Moscow and during 949–1950 over Arkhangel'sk. Works previously published, especially the work by M. NEIURGER (1949) in *Journal of Meteorology*, (*see item* 3F–119, June 1952, *MAB*.) have been used. he author concluded that the albedo of clouds depends on their thickness. The clouds of rystalline structure have a greater albedo. The albedo of stratus clouds is equal at different titudes. The comparison of theoretical and observed relations between the value of albedo nd the thickness of cloud show a significant increase in water content with increasing thickness. *ubject Headings:* **1. Albedo of clouds 2. Cloud structure.**—*N.T.Z.*

4.8–121 551.521.3:551.590.24

Schedler, A. (*Hochserfaus*), **Die Sonnenstrahlung während der partiellen Sonnenfinsternis n 25. Februar 1952.** [The solar radiation during the partial solar eclipse on February 25, 952.] *Wetter und Leben*, 4(5/7):93–94, July **1952.** fig. **MH-BH**—The apparent turbidity ctor increased from 1.60 to 2.31 during the partial solar eclipse (sheltering of the solar disc 2.0%). *Subject Headings:* **1. Solar eclipses 2. Turbidity.**—*A.A.*

4.8–122 551.521.64

Sittkus, A., **Wanderweg eines atomtechnischen Aerosols.** [Travel of an artificial atomic erosol.] *Naturwissenschaften*, 40(6):198, March **1953.** table. **DWB**—Observations with a eiger-Müller counter at 2 places near Freiburg, Oct. 9–31, 1951, showed no 10% impulses bove zero at 1200 m above MSL during period of such impulses at 370 m. The latter are herefore attributed to a local source and not, as by W. HERBST and K. PHILIPP, to traces of om bomb explosions. *Subject Heading:* **1. Corpuscular radiation.**—*C.E.P.B.*

4.8–123 551.521.7:551.513

Willett, H. C. (*M.I.T.*), **Atmospheric reactions to solar corpuscular emissions.** *American Meteorological Society, Bulletin*, 33(6):255–258, June **1952.** fig., 10 refs. **MH-BH**—The uthor reviews some of the literature on the apparent reactions of the sea level pattern of the

general circulation of the Northern Hemisphere to the irregular outbursts of radiations of solar corpuscles; namely the atmospheric response to strong solar disturbances during periods of high solar activity is one of strong polar anticyclogenesis of the blocking type which produces an irregular cellular pattern of the general circulation and a rise in pressure in the higher latitudes and a slight fall in the middle latitudes during maximum solar particle emission. Also evidence showing a rise of temperature at the 20 to 10 mb levels in the stratosphere as a result of a solar disturbance is reviewed. Qualitative explanations for these phenomena are offered. *Subject Headings:* **1. Corpuscular radiation 2. Atmospheric circulation 3. Anticyclogenesis 4. Solar activity.**—*I.L.D.*

TEMPERATURE

See also: **High sounding balloon ascents, upper air temp., India** (Krishna), 4.8–41; **Atmos. heat flux analysis** (John, Gerhardt), 4.8–90; **Interdiurnal variability of temp. and pressure, troposphere, stratosphere** (Schwarzl), 4.8–142, **Tropospheric index-of-refraction fluctuations and profiles measurement** (Crain, Deam, Gerhardt), 4.8–267.

4.8–124 551.524.1:551.501.7

Sawyer, J. S., **The effect of atmospheric inhomogeneity on the interpretation of vertical temperature soundings.** *Great Britain. Meteorological Research Committee, M.R.P.* 775, Nov. 18, **1952.** 4 p. 4 figs. Mimeographed. **DWB**—Small-scale temperature fluctuations (radius 50 km or so) limit interpretation of vertical soundings. Flight grids in a homogeneous air mass gave standard deviation of about 0.5°F in normal layers and 0.75 in stable layers. Vertical correlation between fluctuations varies from 0.85 for small separation to zero for 2000 ft. From these facts it is found that any departure of less than 1.5°F from a smooth curve must be treated with caution. *Subject Headings:* **1. Temperature microvariations 2. Aerological diagrams.**—*C.E.P.B.*

4.8–125 551.524.2:551.521

Hess, Seymour L. and Frank, Robert M., **A theory of the temporal and latitudinal distribution of temperature.** *Journal of Meteorology,* 10(2):135–142, April **1953.** 6 figs., 10 refs., 15 eqs. **MH-BH**—Expressions are set up for radiation balance in each latitude and evaluated, assuming albedo 0.39 and transmission coefficient 0.90, to give theoretical annual variation in each latitude. The extremes lag only 2–3 days behind solstices and the observed lag of several weeks is qualitatively attributed mainly to absorption and subsequent re-emission by ground and water. Discrepancies between observed and calculated temperatures in Jan. and July are due mainly to meridional heat transport by large-scale eddy processes. (Same article as 4.7–101, July 1953, *MAB.*) *Subject Headings:* **1. Temperature distribution 2. Radiation calculations.**—*C.E.P.B.*

4.8–126 551.524.3:633.1

Kurashige, K., **On the correlation between rice crops and 5-day mean temperature in Tohoku District.** *Society for the Long-Range Forecast Research of Tohoku District, Journal,* 11(1):1–4, March **1951.** diagr., graphs. In Japanese, English summary p. 50; headings in English. **DWB**—Correlations of rice crop with 5-day mean temperature reach maxima exceeding 0.5 with early and late Aug. temperatures in Iwate, and with July and late Aug. in other districts. Correlation is greatest when temperature is 22–23°C and temperature variation greatest. The observed coefficients agree with those calculated from these relations. *Subject Headings:* **1. Crop yield forecasting 2. Japan.**—*C.E.P.B.*

4.8–127 551.524.32:551.506.3

*Branicki, Oskar (*Met. Hauptobservatorium, Potsdam*), **Der Jahresgang der Lufttemperatur in Potsdam.** [Annual course of atmospheric temperature in Potsdam.] *Zeitschrift für Meteorologie,* 6(7):197–201, July **1952.** 3 figs., 4 tables. **DWB**—In continuation of a series of long period observational data from Potsdam, tables of average daily mean temperature, of pentad mean temperature and of maximum and minimum daily mean temperature are presented for 1901–1950. Curves of average, maximum and minimum daily mean temperature, smoothed mean temperature curves and a curve representing departures of mean temperature

uring 1901–1930 from that of 1901–1950 are added. *Subject Headings:* **1. Annual temperature ariations 2. Long period records 3. Potsdam, Germany.**—*G.T.*

4.8–128 551.524.32

*Cannegieter, H. G., **Het gemiddelde verloop van het weer in de loop van het jaar.** [The verage regime of the weather in the course of the year.] *Hemel en Dampkring*, 50(11):193–95, 1952. 3 figs. **DLC**—The seasonal variation in number of very cold days (Nov.–March) ccording to several categories (min. <0°C, mean <0°C and maximum <0°C), and of hot lays (mean >18°C, maximum >25°C and >30°C) for the period 1898–1950 and the 5-day nean temperature anomalies 1898–1947, for De Bilt, Netherlands, are shown graphically to llustrate the pronounced variations which occur in the average course of the weather, even vhen long series of observations are used. The conclusion is that daily means or frequencies r at least 5-day means should be used rather than smooth monthly mean curves to show the narked and numerous singularities or variations in the annual curve of a weather element. *Subject Headings:* **1. Singularities 2. Temperature anomalies 3. Annual temperature ariations 4. De Bilt, Netherlands.**—*M.R.*

4.8–129 551.524.33(411)

McIntosh, D. H., **Annual recurrences in Edinburgh temperature.** *Royal Meteorological Society, Quarterly Journal*, 79(340):262–271, April 1953. 4 figs., 6 tables, 11 refs. **DWB**—Monthly mean temperatures at Edinburgh for 50 year broken periods 1770–1840, 1841–94, nd for 1901–50, are analyzed for annual and semi-annual harmonic terms; and departures of aily means from smooth curves, calculated from these harmonics, were examined statistically n various ways. Results show that there was a statistically real though small tendency for imilar departures from the mean to occur on the same dates in different years, most marked vith negative departures. BUCHAN's cold spells in May and Nov. and warm spells in July nd Dec. received slight support, but not the others. *Subject Headings:* **1. Temperature eriodicities 2. Temperature singularities 3. Edinburgh, Scotland.**—*C.E.P.B.*

4.8–130 551.524.36:551.583.15

Brose, Karl, **Der warme Sommer 1952 in der 74jährigen Beobachtungsreihe von Bamberg.** The warm summer of 1952 in the 74-year series of observations at Bamberg.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:41–46, 1952. fig., 4 tables, 12 refs. **DWB**—Summers at Bamberg, Bavaria, are classified according to mean, day and night temeratures, "glow" days (mean >25°C), etc. Summers 1947, 1911, 1921 were "hot," 1952 very warm," 1913 and 1909 cold. *Subject Headings:* **1. Hot summers 2. Bamberg, Germany.** *–C.E.P.B.*

SOIL TEMPERATURES

4.8–131 551.525.4

Neubauer, H. F. (*Java*), **Notizen über die Temperatur der Bodenobserfläche in Afghanistan.** [Notes on the temperature of the earth's surface in Afghanistan.] *Wetter und Leben*, (9–10):165–168, Dec. 1952. **MH-BH**—A series of some 800 soil temperature measurements t a depth ranging from 1.5 to 20 cm were made in various soils in Afghanistan during the ntire year 1951 and representative data for different soils during different seasons are reroduced. The relationship between soil temperatures and soil types is discussed. *Subject Headings:* **1. Soil temperatures 2. Soil types 3. Afghanistan.**—*I.L.D.*

4.8–132 551.525.5

Black, Robert F. (*U. S. Geol. Survey*), **Ice wedges in perenially frozen ground studied.** Summary of his paper.] *U. S. Geological Survey, Information Service Release*, Nov. 10, 1951. 4 p. **MH-BH**—The origin and physical structure of ice wedges found in the soil of N. Alaska are discussed. These investigations were made from Sept. 1949–Nov. 1950 in four ifferent geological environments, when many hundreds of ice wedges were examined under a etrographic microscope (using polarized light) and their structure photographed. *Subject Headings:* **1. Ice wedges 2. Permafrost 3. Northern Alaska.**—*N.T.Z.*

4.8–133 551.525.5

Vasil'ev, I. S., **Promerzanie i ottaivanie pochvy v usloviiakh Podmoskov'ia.** [Freezing and thawing of soils under climatic conditions near Moscow.] *Pochvovedenie*, Moscow, No. 9:769-783, Sept. **1952.** 4 figs., 8 tables, 7 refs. **DLC**—Results of observations made during the winter 1950–51 are presented. About 1000 degree-days (total of negative daily temperatures in °C) gave a frozen depth of 70 cm in a field with snow cover $h = 25$ cm, at $h = 8$ cm and 23 cm in a forest ($h = 26$ cm). 0.35 positive degree-days were necessary for the thawing of 1 cm snow on the field, 0.73 in the forest, 2–4 for the thawing of 1 cm of soil, 70 to 90% if the water content of the soil were considered to be lost in surface runoff. *Subject Headings:* **1. Soil freezing 2. Soil thawing 3. Moscow, U.S.S.R.**—*A.A.*

4.8–134 551.525.5

Werenskiold, Werner, **The extent of frozen ground under the sea bottom and glacier beds.** *Journal of Glaciology*, 2(13):197–200, April **1953.** 7 figs., eqs. English and German summaries p. 197. **GB-MO**—In Swedish colliery in Braganza Sound, Spitsbergen, 0°C was reached 320 m below low flat ground near shallow sea, at mean surface temperature of −8°C. It is calculated that frozen ground below sea must extend 100 m from coast. The calculations are applied to frozen ground beneath fiords less than and more than 400 m across, and below glaciers. *Subject Headings:* **1. Permafrost 2. Spitsbergen.**—*C.E.P.B.*

RIVER AND LAKE TEMPERATURES

4.8–135 551.526.8:551.311.182

Cole, Robert O. (*Fairbanks, Alaska*), **The Yukon River breakup of 1952.** *Weatherwise*, 5(4):88–89, Aug. **1952.** 2 figs. **MH-BH**—At Ft. Yukon, channel and shore ice broke up and began moving down-stream at 8:57 p.m. May 22, 1952—one of latest breakups on record. The ice moved at a rate of about 5 mi/hr down the Yukon Delta to Bering Sea. Several ice jams were bombed by U. S. Air Force to prevent water from backing up and flooding villages. Discusses hydraulic forces and temperature conditions which lead to breaking up and thawing of ice. *Subject Headings:* **1. River ice 2. Yukon River, Alaska.**—*M.L.R.*

4.8–136 551.526.8(436)

Hofstetter, G., **Die interdiurne Veränderlichkeit von Seeoberflächen- und Seeabflusstemperaturen.** [The interdiurnal variability of lake surface and outflow temperatures.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(3):281–293, **1953.** fig., 4 tables, 14 refs. German, English, French summaries p. 281–282. **MH-BH**—Mean change of surface temperature, 7 h–7 h of 6 Austrian lakes is tabulated by months; annual mean 0.3 - 0.5°C, minimum Dec.–Jan., maximum June–July. Annual variation of outflow temperature is smaller. Different lakes show the phenomena differently; mainly because of different thermal stratifications; in the outflow water these are smoothed by mixing. In 3 lakes diurnal variation of interdiurnal variability is studied; it is much greater 14 h–14 h than 7 h–7 h. Frequency distributions of 7 h–7 h changes are tabulated; range in winter +3.0 to −3.2, summer +3.6 to −5.5°C; causes of extreme values are discussed. *Subject Headings:* **1. Lake temperatures 2. Austria.**—*C.E.P.B.*

4.8–137 551.526.8

Nagai, Masao, **On the diurnal variation of surface water in Lake Chuzenjiko during the autumn.** *Oceanography and Meteorology*, Nagasaki, 5(3/4):62–66, Dec. **1951.** 4 tables, 6 refs. In Japanese, English summary p. 66. **DWB**—Data on the vertical distribution of water temperature in Lake Chuzenjiko down to a depth of 162 m, on diurnal variation of surface water temperature down to 10 m, on the effect of insolation on surface water temperature and on calculated values of surface water temperature are presented. The calculated values are based on the differential formula of thermal conduction under the ground, assuming an eddy conductivity of 14 C.G.S. units. Good agreement is found between the calculated and observed values. *Subject Headings:* **1. Vertical water temperatures 2. Lake Chuzenjiko, Japan.**—*G.T.*

4.8–138 551.526.8

Neubauer, H. F., **Temperaturbeobachtungen in Gewässern Afghanistans.** [Temperature observations in the waters of Afghanistan.] *Wetter und Leben*, 4(8):115–118, Sept. **1952.** 2 refs. **MH-BH**—Temperatures of the streams, rivers, springs, lakes and pools were read in 1951 three times a day—morning, noon and evening—in various parts of Afghanistan. The results of measurement are given in tables. During the summer season the following relationships were obtained between mean temperatures of flowing water and elevations above sea level: 1500m—19.0°C; 2000m—18.4°C; 2500m—16.3°C; 3000m—12.8°C and 3500m—9.0°C. The daily amplitude of rivers and streams ranges between 4° and 12°C; spring temperature increases 2°C from April to July and river temperature increases about 8°C. Extreme temperatures occur only in pools. *Subject Headings:* **1. Water temperatures 2. Afghanistan.**—*I.L.D.*

PRESSURE AND WIND

See also: **Tagging and tracing air parcels** (Braham, Seely, Crozier), 4.8–38, **Atmos. heat-flux analysis** (John, Gerhardt), 4.8–90.

PRESSURE

See also: **Graphical determination of geostrophic wind over point area** (Hovde, Reber), 4.8–37; **Atmos. ozone, upper air conditions** (Normand), 4.8–81; **Origin and distribution of atmos. unrest** (Schaffhauser), 4.8–139; **Drought, 1951, Poland** (Wiszniewski), 4.8–199.

4.8–139 551.541:551.543.3

Schaffhauser, J., **Untersuchungen über Quelle und Ausbreitung der atmosphärischen Unruhe.** [Investigations into origin and distribution of atmospheric unrest.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 5(4):386–410, **1953.** 17 figs., table, 21 refs., eqs. German, English and French summaries p. 386–387. **DWB**—Minute pressure waves of a few seconds period were studied at Friburg by 3 variographs 800 m apart recording by radio at Central Station (apparatus fully described). Examples of records and calculation of direction and velocity shown. Waves came mainly from NW with depression over Atlantic; velocity sometimes exceeded that of sound. Provisionally attributed to waves at surface between two relatively moving air masses, propagated as gravity waves or longitudinal sound waves. *Subject Heading:* **1. Microbarometric oscillations.**—*C.E.P.B.*

4.8–140 551.543.3:523.74

Brier, Glenn W. (*U. S. W. B.*), **Forty-year sea level pressure and sunspots.** *Tellus*, 4(3):262–269, Aug. **1952.** 12 figs., 2 tables, 11 refs. **MH-BH**—The 40½ years of mean monthly sea level pressure maps based on the Historical Map Series have been typed according to numerical indices that indicate to what extent each particular monthly map resembles a typical or normal winter or summer map on one hand, or a typical spring or fall map on the other hand. These indices are easily determined from the average pressure of certain key areas and are quite effective in separating the winter from the summer months and the spring months from the fall months. The persistence in these indices and their relation to the sunspot cycle has been investigated. *Subject Headings:* **1. Pressure variations 2. Sunspot effects.**—*Author's abstract.*

4.8–141 551.543.5:551.515.1

§Lawrence, E. N., **Barograph records of deep depressions.** *Meteorological Magazine*, London, 82(970):122–123, April **1953.** 2 figs. **DWB**—Barogram at Reykjavik and surface chart of deep depression (about 930 mb) of Jan. 18, 1944, are shown and discussed. *Subject Headings:* **1. Extratropical cyclones 2. Pressure extremes 3. North Atlantic.**—*C.E.P.B.*

4.8–142 551.547.3:551.524.7

Schwarzl, S., **Die interdiurne Veränderlichkeit von Druck und Temperatur in Troposphäre und Stratosphäre.** [The interdiurnal variability of pressure and temperature in troposphere

and stratosphere.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A.*, 5(4):411–431, **1953.** 7 figs., 5 tables, 9 refs. German, English and French summaries p. 411–412. **DWB**—Interdiurnal variabilities of height and relative topography of pressure surfaces were calculated for points in Europe Jan.–June 1943 for 1000, 500, 225 and 96 mb. Mean charts are given for 500, 225 and 96 mb and mean values for latitudes 40–70°. A connection is found between variability and inclination of the pressure surfaces, and other points are brought out. Other data are used to compute annual variations in different latitudes and heights. *Subject Headings:* **1. Upper air pressure 2. Upper air temperatures.**—*C.E.P.B.*

TURBULENCE

See also: **Homogeneous turbulence theory** (Batchelor), 4.8–2; **Turbulent mixing** (Cramer), 4.8–91; **Turbulent exchange between extratropical tropospheric and polar stratospheric air** (Arakawa), 4.8–99.

4.8–143 551.551:551.557:551.593.12

Chandrasekhar, S., **A statistical basis for the theory of stellar scintillation.** *Royal Astronomical Society, Monthly Notices*, 112(5):475–483, **1952.** 10 refs., 67 eqs. **DWB**—"From the known facts concerning astronomical seeing it is concluded that we can satisfactorily account for the observed phenomena by postulating a turbulent layer of the thickness of the order of a hundred metres, a micro-scale of turbulence of order of ten centimetres and a root mean square fluctuation in refractive index of the order of 4×10^{-8}." *Subject Headings:* **1. High level turbulence 2. Scintillation.**—*From author's abstract.*

4.8–144 551.551

Clodman, J., **Critical value of the Richardson number.** *Royal Meteorological Society, Quarterly Journal*, 79(340):293–294, April **1953.** 3 refs., 2 eqs. **DWB**—Points out that statement that Ri(crit) = 0.65 is a misinterpretation. Actually Ri(crit) is about 1.5. *Subject Heading:* **1. Richardson number.**—*C.E.P.B.*

4.8–145 551.551:551.511

Frankenberger, Ernst, **Eine notwendige Bedingung für die Ausbildung von Konvektion in der bodennahen atmosphärischen Reibungsschicht.** [A necessary condition for the development of convection in the atmospheric friction layer near the ground.] *Naturwissenschaften*, 40(5):162–163, March **1953. DWB**—Convection can only occur in the absence of wind shear. A limiting expression is given and approximately evaluated as $v\ {}^{1}u'L^{2}$ not greater than $13\times10^{11}\pm50\%$, where v = wind (cm/sec). *Subject Heading:* **1. Convection.**—*C.E.P.B.*

4.8–146 551.551:551.513

Hubert, Lester F. (*U.S.W.B., Wash., D. C.*), **Model experiments in the formation of eddies by lateral shear.** *American Geophysical Union, Transactions*, 33(6):817–824, Dec. **1952.** 6 figs., table, 6 refs. **MH-BH**—An apparatus has been constructed to contain a shell of fluid (air) in the shape of a 70° spherical segment extending from the pole (axis of rotation) to 55° latitude, and to produce lateral shear and rotation in the fluid. The shear was produced by rotating the fluid between 70° and 90° latitude (the polar cap) at a different rate from the fluid between 55° and 70° latitude (the zone). Experiments show that this lateral shear can produce large organized eddies in a rotating fluid shell under conditions that can be interpreted as being dynamically unstable and that the eddies are totally absent under conditions of dynamic stability. (Dynamic instability exists when the angular momentum of the fluid decreases with increasing radial distance from the axis of rotation.) In addition to lateral shear, the experiments indicate that an organized transport across the shear zone is also a necessary condition for eddy formation. *Subject Headings:* **1. Eddies 2. Shear lines.**—*Author's abstract.*

4.8–147 551.551

Singer, Irving A. and Smith, Maynard E., **Relation of gustiness to other meteorological parameters.** *Journal of Meteorology*, 10(2):121–126, April **1953.** 11 figs., 2 refs. **MH-BH**—

Gustiness records at 355 ft above ground at Brookhaven are classified into 5 types and frequency of each type related to temperature lapse rate 410–37 ft, wind speed, season and time of day, radiation and cloud cover, and O. G. Sutton's index of turbulence. *Subject Headings:* **1. Gustiness 2. Brookhaven, New York.**—*C.E.P.B.*

4.8–148 551.551

Wyatt, William H. (*U. S. Air Weather Serv.*), **An interesting encounter with clear-air turbulence.** *Weatherwise*, 5(6):134–135, Dec. **1952.** 3 figs. **MH-BH**—A personal experience with clear air turbulence encountered in flight around 38,000–39,000 ft is described. Vertical cross sections of the trip and of atmospheric conditions up to 50,000 ft, and a pressure-temperature curve making the turbulence area appear close to the height of lowest temperature, are presented. *Subject Heading:* **1. Clear air turbulence.**—*G.T.*

FÖHN WINDS

See also: **Trade wind circulation theory** (Flohn), 4.8–100.

4.8–149 551.555.3

Dammann, W., (*Met. Amt, NW Germany*), **Der Föhn als Randproblem der atmosphärischen Dynamik.** [The föhn as marginal problem of atmospheric dynamics.] *Geofisica Pura e Applicata*, 23:162–173, **1952.** 3 figs., 29 refs. In German, English summary p. 162. **MH-BH**—Author gives a historical review on the development of the föhn problem in meteorology and discusses new föhn theories in detail (Rossmann, Frey, Schweitzer, Küttner, etc.). Proposes to combine the thermodynamic approach with dynamic theories. Climatic effect of mountain ranges discussed on the basis of previous works of the author, based on the "Historical Weather Maps." *Subject Headings:* **1. Föhn theory 2. Mountain climatology.**—*A.A.*

4.8–150 551.555.3

†Frey, Karl, **Die Entwicklung des Süd- und des Nordföhns.** [The development of south and north föhn.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 5(4):432–477, **1953.** 17 figs., 9 tables, 101 refs. German, English and French summaries p. 432–434. **DWB**—Pt. 1 summarizes the observed data of changes of temperature and of pressure gradients at various heights, winds, and thermal influence on pressure gradients, in S and N föhn in Alps. Autographic records and radiosonde ascents are reproduced for periods representing different types of development. In Pt. 2 the evolution of S föhn is divided into 5 stages: 1) anticyclonic subsidence and divergence; 2) cyclonic, sweeping away surface cold air on N side; 3) the rare dimmerföhn in which the föhn wall crosses the Alpine crest; 4) the end of the S föhn when cold air from the west reverses the solenoidal field, leading to 5) the N föhn stage. In Pt. 3 author looks back on history of föhn theory. *Subject Headings:* **1. Föhn theory 2. Dimmerföhn.**—*C.E.P.B.*

4.8–151 551.555.3:634.94(79)

Henson, W. R. (*Canadian Dept. Agri. Forest Insect. Lab.*), **Chinook winds and Red Belt injury to Lodgepole pine in the Rocky Mountain Parks area of Canada.** *Canada. Dept. of Agriculture, Div. of Forest Biology, Contribution*, No. 28:62–64, [after **1950**]. 2 refs.—Description of local climatic conditions causing winter injuries in a sharply defined belt. The alternate cooling and warming in air of low moisture content in connection with chinook winds appears to be responsible for the discoloration of trees. *Subject Headings:* **1. Chinook winds 2. Wind damage 3. Forests 4. Canada.**—*A.A.*

4.8–152 551.555.3:551.579(79)

*§Hoover, O. H., **Effect of chinook (foehn) winds on snow cover and runoff.** *International Union of Geodesy and Geophysics, International Association of Scientific Hydrology, [Transactions] Oslo, 1948*, 2:86–100, [**1949**]. 8 figs., table. **DWB**—General characteristics and effect of chinook winds in Alberta and adjacent provinces or states are described. Greatest effect is produced by moist air masses moving from the Pacific across Continental Divide and arriving as dry air with same temperature as when it left the coast. An example (March 17–

24, 1939) is given and the synoptic meteorological and hydrological conditions attending this föhn or chinook, analyzed and illustrated with charts and graphs. Meteorological data are also given for period. *Subject Headings:* **1. Chinook winds 2. Alberta, Canada.**—*M.R.*

4.8–153 551.555.3(411)

§Lawrence, E. N., **Föhn temperature in Scotland.** *Meteorological Magazine,* London, 82(969):74–79, March **1953.** 4 figs., 2 tables, 3 refs. **MH-BH**—Feb. 15–18, 1945, SW air stream from Azores crossed Scottish mountains (uplift 3000 ft) giving precipitation and descended again at dry adiabatic lapse. Temperature, dew point and rainfall calculated from tephigram agree with observed values. Maximum temperatures of 61–62°F are a record for Scotland in Feb. *Subject Headings:* **1. Föhn winds 2. Scotland.**—*C.E.P.B.*

WIND EFFECTS

See also: **Graphical determination of geostrophic wind over point area** (Hovde, Reber), 4.8–37; **Atmos. waves and vorticity discontinuities** (Queney), 4.8–89; **Tornadoes, U. S.** (U. S. Weather Bureau), 4.8–110; **Statistical basis of theory of stellar scintillation** (Chandrasekhar), 4.8–143; **Meteoropathological observations during SSE winds, Dresden** (Warmbt), 4.8–250; **Atomic aerosol track** (Herbst, Philipp), 4.8–276.

4.8–154 551.556.3:621.311.24

*Sil, J. M. (*Met. Office, New Delhi*), **Windmill power.** *Indian Journal of Meteorology and Geophysics,* 3(2):77–90, April **1952.** 8 figs., 6 tables, 2 refs. **MH-BH**—Output of windmill power for irrigation purposes compared with anemograph observations at Poona. Horse power (P) developed per sq ft of surface is approximately $P=\frac{5}{8}v^3$; v—wind speed in m.p.h. Theoretical considerations given and actual data presented. *Subject Headings:* **1. Windmills 2. Wind speed data 3. Wind utilization 4. Poona, India.**—*A.A.*

4.8–155 551.556.3:621.311.24

Sanuki, M. (*Met. Res. Inst., Tokyo*), **A short note on the maximum possible power of windmills.** *Geophysical Magazine,* Tokyo, 23(4):303–304, May **1952.** fig. **MH-BH**—Results of experiments on the power generated by a particular windmill are plotted and compared with the theoretical curve calculated by the formula of H. Glauert. The experiments show that the maximum power is realized with the three bladed windmill and attains about 63% of the theoretical value. The difference between the theoretical and experimental result may be attributed to the loss occasioned by the profile drag of the windmill sections and also to the finite number of blades. *Subject Headings:* **1. Wind power calculations 2. Wind utilization 3. Windmills.**—*I.L.D.*

4.8–156 551.557.31(547)

*Parthasarathy, S. and Narayanan, J. (*Met. Office, Poona*), **The diurnal variation of upper winds over Bombay and Poona.** *Indian Journal of Meteorology and Geophysics,* 3(3):197–203, July **1952.** 3 figs., table, 3 refs. **DWB**—Diurnal course of wind velocities up to 2.5 km studied by the aid of monthly means (5 years). The land and sea breeze is clearly shown also by means of surface pressure maps which are presented for each season, 0800 and 1700 IST, and show a high over the land in the morning, and a low in the afternoon. *Subject Headings:* **1. Diurnal upper air wind variations 2. Land and sea breezes 3. Bombay, India 4. Poona, India.**—*A.A.*

VERTICAL CURRENTS

See also: **Vertical stability, vertical current** (Watanabe), 4.8–92; **Downdraft thermodynamics** (Ray Choudhuri), 4.8–93; **Gravitational convection from boundary source** (Rouse, Yih, Humphreys), 4.8–94; **Large scale vertical eddy stress in free atmos.** (White, Cooley), 4.8–95.

4.8–157 551.558

Bulavko, A. C. and Sorochenko, N. K., **Voskhodiashchie vozdushnye potoki redkoĭ sily.** [Vertical air current of unusual force.] *Meteorologiia i Gidrologiia,* No. 7:28–30, **1952.** DLC

—Two parachutists were dropped over the Borisov Region (Minsk province) at 5.30 p.m. of August 1, 1950 and landed, the first after 40 min, and the second after 2 hrs. The probable lift of the second one is assumed to be 3 km. The region was located in an area of diffused pressure field, with secondary cold front passing by and powerful cumulus clouds. The two layers of cumulus had bases at about 1200 m and 3100 m. Air temperature near the soil surface was 18–20°C, lapse rate was 0.7–08°. Thunder activity was registered in the region from afternoon to 8–9 p.m. *Subject Headings:* **1. Vertical currents 2. Borisov Region, U.S.S.R.**—*N.T.Z.*

4.8–158 551.558.1

Malkus, Joanne S.; Scorer, R. S. and Ludlam, F. H., **Bubble theory of penetrative convection.** *Royal Meteorological Society, Quarterly Journal*, 79(340):288–292, April **1953.** 2 figs., 3 refs. **DWB**—J. S. MALKUS severely criticizes paper by SCORER and LUDLAM (*R. Met. Soc., Quart. J*, 79(339):94–103, Jan. 1953) on the basis of flights through trade cumulus. SCORER and LUDLAM reply. *Subject Headings:* **1. Bubble theory 2. Entrainment.**—*C.E.P.B.*

4.8–159 551.558.1

Malkus, Joanne Starr and Stern, Melvin E., **The flow of a stable atmosphere over a heated island. Part I.** *Journal of Meteorology*, 10(1):30–41, Feb. **1953.** 6 figs., 2 tables, 10 refs., 28 eqs. **MH-BH**—Convection in stable air flowing over heated flat islands 5–10 km across near Woods Hole causes periodically spaced rows of small cumuli. The equations of motion are discussed by the method of perturbations and stream lines plotted. Downstream oscillations or "lee waves" are harmonic like forced oscillations of a flexible string. The conditions for their occurrence are examined and their lengths calculated. Results agree with observations over Nantucket Island. *Subject Headings:* **1. Lee waves 2. Thermals.**—*C.E.P.B.*

4.8–160 551.558.1

Stern, Melvin E. and Malkus, Joanne Starr, **The flow of a stable atmosphere over a heated island. Part II.** *Journal of Meteorology*, 10(2):105–120, April **1953.** 13 figs., 9 refs., 49 eqs. **MH-BH**—The results were not entirely supported by observation and the mechanism of heating is examined and represented by an eddy conduction equation in the ground layer. The stream line displacement is given by an equation for air flow over a mountain ridge and a local heat conduction equation. An "equivalent mountain" is calculated for Nantucket for two extreme cases and the complete stream line picture constructed. This gives a method of forecasting lee waves and cloud rows. Other applications are suggested. These two articles are taken from material included in a preliminary report (*see item* 4.5–149, May 1953, *MAB.*) *Subject Headings:* **1. Lee waves 2. Thermals.**—*C.E.P.B.*

AQUEOUS VAPOR AND HYDROMETEORS

See also: **Water in atmos.** (Köhler), 4.8–167.

EVAPORATION

4.8–161 551.573:551.574.1

Luchak, G. (*Suffield, Alberta, Canada*), **Evaporation of droplets in still air.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 13: 86–90, May **1952.** 6 refs., bibliog. Discussion p. 88. **DWB**—Evaporation of droplets of 1 to 2 mm in diameter into still air was studied with nine liquids forming a series of graded volatility from toluene to aniline and including water. The experimental results agreed with calculations based on diffusion and heat transfer theory. The surface temperature of the more volatile droplets was found to be significantly lower (by as much as 4 or 5°C) than the bulk temperature, in contrast to JOHNSON's results for water. Convection effects were found to be present with 43-mm diameter evaporation vessels in confirmation of GILLILAND's suggestion, but were absent in the smaller vessels used in the main investigation. *Subject Heading:* **1. Evaporation of droplets.**—*Author's introductory paragraph.*

4.8–162 551.573(84) 551.577.2(84)

Morales N., Héctor, **Evaporación.** [Evaporation.] *Nimbus*, La Paz, 3(8/9):6–16, Jan./June **1952.** fig., 3 refs. **MH-BH**—After a general discussion of problems involved in computing evaporation, the author analyzes the evaporation regime of the high plateau corresponding roughly to the territory of the Department of Oruro (52,800 km²). This is the coldest region of Bolivia, with temperatures sometimes as low as −23°C. The area extends to an altitude of 3,700 m. It includes the lakes Poopó and Coipasa and the Desaguadero River with its tributaries. Five-year annual mean precipitation values are presented for various parts of the region. Evaporation from Lake Poopó is estimated. *Subject Headings:* **1. Evaporation 2. Precipitation amounts 3. Bolivia.**—*G.T.*

4.8–163 551.573

Penman, Howard Latimer, **The dependence of transpiration on weather and soil conditions.** *Journal of Soil Science*, Oxford, 1(1):74–89, March **1949.** 5 figs., 3 tables. **DA**—Author derives an expression for evaporation from open water involving only values of meteorological elements in the screen and known constants. The seasonal ratios of transpiration from turf with abundant water to open water evaporation are obtained empirically. When water supply is deficient, transpiration depends on soil moisture available in the zone occupied by roots. A composite drying curve is constructed from British transpiration and drainage records. It is found that times of running of field drains can be predicted using only the available water in the root zone, which varies from year to year with the spring rainfall. *Subject Headings:* **1. Evapotranspiration 2. Soil moisture 3. Weather.**—*C.E.P.B.*

4.8–164 551.573:551.461:551.583.7

Schuh, Friedrich, **Die Bedeutung der atmosphärischen Wasserzirkulation für das Klima der Vorzeit.** [The importance of the circulation of atmospheric water for past climate.] *Geologische Rundschau*, 40(1):179–180, **1952.** **DLC**—A brief note on the effect of orogenesis in decreasing the area of the oceans and thereby the amount of evaporation and the circulation of atmospheric water. This causes arid periods. *Subject Headings:* **1. Evaporation 2. Oceans 3. Paleoclimatology.**—*C.E.P.B.*

4.8–165 551.573

Terada, Kazuhiko, **Note to the analysis of data of evaporation from rather large evaporation pan.** *Oceanography and Meteorology*, Nagasaki, 5(1/2):13–15, June **1951.** 2 figs., 5 refs., 5 eqs. In Japanese, English summary p. 15. **DWB**—An expression for the rate of evaporation developed by G. Yamamoto is applied to experimental results obtained by C. Rohwer who used an evaporation pan 3 sq ft. It is found that a curve representing the rate of evaporation will closely follow the pattern of the theoretical curve of turbulent flow. *Subject Headings:* **1. Evaporation rate 2. Evaporation pans.**—*G.T.*

CONDENSATION

See also: **Hygrophotographic analysis of rain and fog droplets** (Sivadjian), 4.8–34; **AgI smoke generator** (Vonnegut, Maynard), 4.8–63; **Evaporation of droplets in still air** (Luchak), 4.8–161.

4.8–166 551.574.1

Birstein, Seymour J. and Anderson, Charles E., **Preliminary report on sea salt as an ice nucleus.** *Journal of Meteorology*, 10(2):166, April **1953.** **MH-BH**—Experiments show that fine particles of sea salt act as ice nuclei in supercooled clouds (at −15°C). *Subject Headings:* **1. Saline nuclei 2. Condensation nuclei.**—*C.E.P.B.*

4.8–167 551.571:551.574.1

Köhler, Hilding, **Vattnet i Atmosfären.** [The water in the atmosphere.] *Uppsala. Universitet. Meteorologiska Institutionen, Meddelande*, No. 9, [**1945**]. 4 figs. Reprinted from: *Ymer*, Stockholm, Sept. **1945.** p. 103–114. **DWB**—After an historical review of various theories on the formation of clouds, rain and icing as a function of condensation, some details of role of condensation in the atmosphere are discussed. Theor's theory that particles

f oceanic salt are condensation nuclei recognizes other hygroscopic nuclei. Investigations ave shown that clouds generally, even below 0°, consist of supercooled water drops and not of ce crystals. The latter form clouds of a distinct class. Icing is due to supercooled water drops nd increases or decreases with magnitude and number of the water drops. *Subject Headings:* **. Water vapor 2. Condensation nuclei 3. Cloud physics.**—*W.N.*

4.8–168 551.574.1

McDonald, James E., **Erroneous cloud-physics applications of Raoult's law.** *Journal of Meteorology*, 10(1):68–70, Feb. **1953.** table, 13 refs., 3 eqs. **MH-BH**—Raoult's law that when m' moles of a non-electrolyte are dissolved in m moles of water, vapor tension e' of olution is related to that of pure water e by $(e'-e)/e=m'/(e'-e)/e=-im'/(im'+m)$ where i s Van't Hoff factor. Values of i are computed for aqueous solutions of NaCl. Resulting eduction of vapor pressure is much larger than is given by Raoult's law. W. E. Howell's omputed growth rates of cloud drops may be 10–15% too low. *Subject Headings:* **1. Cloud hysics 2. Raoult's law.**—*C.E.P.B.*

4.8–169 551.574.1

*Marshall, J. S. and Magarvey, R. H. (*McGill Univ., Montreal, Canada*), **Heat transfer rom falling water drops.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 13:91–100, May **1952.** 4 figs., table, 6 refs., eqs. **DWB**—An experiment is eported in which water was dropped from a hypodermic needle vibrating at frequencies of 00, 300 and 400 cycles/sec, producing drop diameters of 1.35, 1.17 and 1.06 mm, respectively. Data on acceleration, terminal velocity and cooling rate of the drops are presented, discussed nd compared with theoretical or experimental values obtained by other investigators. Particular consideration is given to temperature variation within drops. *Subject Headings:* **. Drop size data 2. Terminal velocity of drops 3. Drop temperature variations.**—*G.T.*

4.8–170 551.574.1

Ooura, H. (*Inst. of Low Temp. Sc., Hokkaido Univ.*), **Condensation and sublimation-nuclei n Wilson chamber.** *Geophysical Magazine*, Tokyo, 23(4):329–340, May **1952.** fig., 10 ables, 28 refs., 8 eqs. **MH-BH**—Using the equation of Turnbull and Fisher, the develop- ment of which is presented, the author calculates theoretically the expansion ratio at which uclei of water and ice are produced in a Wilson chamber with or without the presence of ions. From the results of calculations which show that at an expansion ratio of 1.27 an ice embryo orms without an activated electric charge, that at 1.31 an ice embryo forms with one positive lectron. The surface free energies of ice at various temperatures were calculated from the xperimental values of C. R. Powell, A. W. Brewer and H. P. Palmer and were used to alculate the activation of free energy necessary for an ice nucleus to grasp one molecule of vater vapor; this energy is 1.0×10^{-12} erg/molecule. *Subject Headings:* **1. Condensation nuclei . Cloud chambers.**—*I.L.D.*

4.8–171 551.574.1

Parkinson, W. C. (*Observatorio Nacional de Brazil, Rio de Janeiro*), **Note on the concen- ration of condensation nuclei over the western Atlantic.** *Journal of Geophysical Research*, 7(2):314–315, June **1952.** 7 refs. **MH-BH**—Observations with Aitken pocket dust counter n a voyage New York to Rio de Janeiro gave mean of 676 nuclei per cc. *Subject Heading:* **. Condensation nuclei count.**—*C.E.P.B.*

4.8–172 551.574.1

Rau, Walter, **Über den Einfluss des Tropfenvolumens auf die Unterkühlbarkeit von Vassertropfen und die Bedeutung des Gefrierkernspektrums.** [On the influence of drop olume on the supercooling of water drops and the importance of the freezing nucleus spec- rum.] *Zeitschrift für Naturforschung*, 8a(2/3):197–204, Feb./March **1953.** 6 figs., 14 refs. **DLC**—Observations on water drops cooled on polished chromium showed that J. R. Heverley's unctional relation between freezing point and drop size does not apply to very small drops. The relatively greater supercooling of small drops is due only to the smaller chance that they ontain nuclei causing freezing at higher temperatures. The peaks of the freezing spectrum

at −4, −10 to −12 and −20°F are independent of drop size, but crystallization in the −20 group increases in frequency with decreasing drop size because nuclei affecting crystallizatio at −10 to −12° are rarely absent from large drops and this masks the effect of the −20 nuclei. Eleven frequency curves of freezing temperatures are given for drops ranging fro 0.015 to 600 mm³ volume. *Subject Heading:* **1. Freezing nuclei.**—*C.E.P.B.*

4.8–173 551.574.

Reiss, Howard (*Boston Univ.*), **Theory of droplet growth.** *U. S. Air Force. Cambridg Research Center, Geophysical Research Papers*, No. 13:40–50, May **1952.** 5 figs., 10 ref **DWB**—The author gives a theoretical analysis of physical properties of a condensation nucleu of the rate of phase transition and of phase transition in a binary system. The effect of th introduction of various kinds of foreign nuclei is considered. *Subject Headings:* **1. Dro growth 2. Condensation nuclei.**—*G.T.*

4.8–174 551.574.1:551.501.8

Wexler, Raymond and Boucher, Roland J., **Theoretical studies related to the growth c precipitation particles, and empirical studies and statistical analyses of particle size distribu tions in rain and clouds and their relationship to radar reflectivity.** Mount Washingto Observatory, Contribution to the theory of the constitution of clouds, Contract AF 19(122)-39 Final Report, July 31, **1952.** 4 p. refs. **DWB**—This report consists of 6 papers prepare under the above quoted contract during the period Oct. 1950–July, 1952. The papers appeare in Quarterly Progress Reports and in Scientific Reports of the contractor. The subject covered are the effect of coalescence on drop size distribution, radar echoes from thunderstorm heat balance of growing ice particles, nylon screen for measuring drop size distribution, an of liquid water content. *Subject Headings:* **1. Drop size distribution 2. Drop growth 3. Rada analysis of precipitation 4. Coalescence 5. Liquid water content of clouds. I. Mou Washington Observatory II. Contract AF 19(122)-399.**—*G.T.*

4.8–175 551.574:629.13

Gray, Vernon H., **Simple graphical solution of heat transfer and evaporation from surfac heated to prevent icing.** *U. S. NACA, Technical Note*, 2799, Oct. **1952.** 19 p. 4 figs., 2 refs., 23 eqs. **DWB**—Equations expressing the heat transfer and evaporation from wette surfaces during the ice prevention have been simplified and regrouped to permit solutions b simple graphical means. Working charts for quick and accurate anti-icing calculations ar also included. *Subject Headings:* **1. Icing of aircraft 2. Icing prevention 3. Evaporation.** *NACA abstract.*

FOG

4.8–176 551.575.1:551.588.

Imahori, K., **On the vanishing mechanism of advection fog and the effect of woods upo fog reduction.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number, p. 121–14 March **1952.** 11 figs., 5 tables, 8 refs., eqs. In Japanese, English summary p. 329. **MH-BE** —The processes leading to the dissipation of drifting advection fog are classified into 1) fallin drop or gravity effect, 2) diffusion by turbulent motion with or without gravity effect an 3) temperature effect, especially destruction of inversion. Differential equations for eac are set up, and the quantitative solutions shown in graphs and tables. Forests act throug reduction of eddy diffusivity of turbulent air and the most effective planning of a forest fo fog prevention is discussed. *See also* paper by J. Hori, *ibid.* p. 167–174. *Subject Heading* **1. Fog dissipation 2. Forest influences 3. Japan.**—*C.E.P.B.*

4.8–177 551.575.1:551.509.3

Mahaffy, F. J., **The occurrence of radiation fog at Dorval Airport, Montreal, Quebe** *Canada. Meteorological Div., Cir.*, 2065, Tec. 108, Jan. 21, **1952;** *Local Forecast Study* No. 1 8 p. 8 figs., 4 refs. **DWB**—An annual average of 12.5 nights with radiation fogs was observe from 1946 to 1949, with maximum in Oct. The synoptic conditions are briefly discussed an a few relationships are given as an aid for forecasting. The minimum temperature could b foreseen fairly well if the surface wind velocity were known. *Subject Headings:* **1. Radiation fo 2. Airports 3. Local forecast studies. 4. Dorval Airport, Canada**—*A.A.*

4.8–178 551.575.1:551.509.5

§Morita, Y., **Weather situations during the sea fog observation, 1951.** *Journal of Meteorological Research*, Tokyo, v. 4, Suppl. Number, p. 33–37, March **1952.** 5 figs. In Japanese, nglish summary p. 322–323. **MH-BH**—Synoptic situation, air mass, wind direction and eather sequence are tabulated for 10 days of sea fog at Ochiishi, June 15—July 1, 1951. ynoptic charts are shown for some days. *Subject Headings:* **1. Fog formation 2. Fog forecasting 3. Japan.**—*C.E.P.B.*

4.8–179 551.575.3(435)

Markgraf, Hans, **Der Nebelwinter 1952/53 im Revier von Elbe, Weser und Ems.** [The oggy winter 1952/53 in the region of Elbe, Weser and Ems.] *Wetterlotse*, 56:105–112, April **953.** 2 figs., tables. **DWB**—Fog days and hours at Cuxhaven and Altenbruch from Oct. 952 through Feb. 1953 are tabulated and compared with averages and past years. The nusual fogginess is related to the maritime source of the air. *Subject Headings:* **1. Fog frequencies 2. Germany.**—*C.E.P.B.*

4.8–180 551.575.36(547)

*§Rangarajan, S. (*Regional Met. Center, Bombay*), **Fog at Santacruz Airport.** *Indian ournal of Meteorology and Geophysics*, 3(3):186–196, July **1952.** 11 figs., 3 tables, 2 refs. **WB**—Fog (with visibility ≤1 mile) occurred on 22 days during the period 1944–1951, most ften in Feb. and March. Synoptic situations classified and a fog prediction diagram presented. og can be expected with (gradient) winds from NNW to SSE and relative humidity over 70% t 2330 IST). *Subject Headings:* **1. Fog forecasting 2. Airports 3. Objective forecasting Santacruz Airport, Bombay, India.**—*A.A.*

4.8–181 551.575.5

§Douglas, C. K. M. and Stewart, K. H., **London fog of December 5–8, 1952.** *Meteorological Magazine*, London, 82(969):67–71, March **1953.** 2 figs., photo. **MH-BH**—Prolonged g due to calm in stationary anticyclone, below combined subsidence and surface radiation versions. Illustrated by synoptic chart for Dec. 6 and tephigrams, and compared with rlier fogs. The part played by atmospheric pollution is discussed. *Subject Headings:* **Radiation fog 2. London, England.**—*C.E.P.B.*

4.8–182 551.575.5(42)

The London fog. A first survey of the December disaster. *Smokeless Air*, London, 5:100–111, Spring **1953.** 7 figs., 5 tables. **DWB**—The fog of Dec. 5–8, 1952, developed elow an inversion 200–500 ft up. Smoke rose from 0.49 to 4.46 mg/m³ and SO_2 from 0.14 to .34 p.p.m., more at peak. Death rate trebled, due especially to bronchitis and pneumonia, specially in older people; sickness also increased greatly. Cattle died in Smithfield Show and lants at Botanic Gardens, Kew, suffered. Total cost of fog estimated as £10 million; effect n stores discussed. On p. 111–113 questions in Parliament about the fog are reported. *ubject Headings:* **1. Winter fog 2. London, England.**—*C.E.P.B.*

CLOUDS

See also: **Cloud visibility, radar reflectibility and drop size distribution** (Atlas, Bartnoff), 4.8–264.

4.8–183 551.576.12

Germany. Meteorologisches Amt für Nordwestdeutschland, **Wolkentafel für Wetterbeobachter auf See.** [Cloud table for weather observers at sea.] Hamburg, **1952.** 35 p. llus. **DWB**—A collection of annotated cloud pictures. Thirty-two types of clouds are llustrated in reproductions of paintings with brief notes, explaining physical properties of each ype, added. The arrangement follows the international classification using a symbol for eight (low, middle or high) and numerals from 1 to 9 for different types in each height group. *ubject Heading:* **1. Cloud classification.**—*G.T.*

4.8–184 551.576.12:551.515.2

Simpson, R. H., **Clouds seen in the middle of a typhoon.** *Weather*, 8(5):152, May **1953.** 3 figs. **MH-BH**—Three photos taken from a U. S. aircraft in the eye of the typhoon "Marge" in W. Pacific on Aug. 15, 1951, are reproduced. For fuller account *see* American Meteorological Society, Bulletin, 33:186, Sept. 1952. *Subject Heading:* **1. Typhoon clouds.**—*C.E.P.B.*

4.8–185 551.576.12

Wexler, Harry and Bishop, Robert, **An astonishing cloud.** *Natural History*, N. Y., 62(1):1, Jan. **1953.** photos. **DWB**—A remarkably vivid photograph of a roll of lee vortex cloud near Independence, Calif. with a brief explanation by HARRY WEXLER. *Subject Headings:* **1. Lee vortex clouds 2. Sierra Nevada, California.**—*M.R.*

4.8–186 551.576.2(438) 551.576.3:551.521.11

*Stenz, Edward, **Zashmurzenie polski.** [Cloudiness in Poland.] *Przegląd Meteorologiszny i Hydrologiczny*, No. 1/2:69-81, **1952.** 3 figs., 2 tables, 20 refs., 3 eqs. English summary p. 80–81. **MH-BH**—Complete mean data of cloudiness for Poland on the basis of observations from more than 78 stations are presented and analyzed. The period of observations used ranged from 25 to 50 years. Tables contain the monthly and the annual means of cloudiness for 22 selected stations (average period 35 years), mean frequency of clear and cloudy days for months, seasons, and year. In conclusion, the equations showing relation between cloud amount and the frequency of clear and cloudy days, and a formula for sunshine as function of cloud amount are presented. *Subject Headings:* **1. Cloudiness data 2. Sunshine duration 3. Poland.**—*N.T.Z.*

4.8–187 551.576.2(494)

Thams, J. Chr. (*Osservatorio Ticinense, Locarno-Monti, Switzerland*), **Zum Problem der Doppelschätzung der Bewölkungsmenge.** [On the dual method of estimating cloudiness.] *Naturforschende Gesellschaft, Zürich, Vierteljahresschrift*, 93:223–237, **1948.** graphs, tables, refs. Also: *Switzerland. Meteorologische Zentralanstalt, Mitteilungen*, Dec. 31, **1948. DWB**—The decision reached at the International Meteorological Conference, Vienna, in 1873, to disregard the density of clouds in reports on cloudiness, is criticized. Results obtained in Locarno by following this resolution are compared with those obtained through discrimination between low clouds and high cirrus clouds. Monthly, seasonal, yearly and total frequency of high, medium and low clouds at Locarno during the years 1945–1947 are presented. Author concludes that as far as the station in question is concerned, a better relationship between sunshine duration and cloudiness is obtained if distinctive values are applied to high and low clouds and preferably even to medium clouds. Stations unable to make such discrimination, author believes, should disregard high cirrus clouds altogether. *Subject Headings:* **1. Cloudiness 2. Cloud observations 3. Cloud frequencies 4. Sunshine duration 5. Switzerland.**—*G.T.*

PRECIPITATION

See also: **Agro-meteorological studies** (Unger), 4.8–24; **Evaporation** (Morales), 4.8–162; **Sunspots and rainfall measurements** (Toelle), 4.8–261.

4.8–188 551.577:551.509.67:628.13

Arizona has rain aplenty, first time in decade. *Engineering News-Record*, 150(5):37, Jan. 29, **1953. DLC**—Brief note on the improvement of the water balance in Arizona. At the start of 1952, after a dry decade, Salt River Valley Project reservoirs which have a capacity of 2 million acre-ft, held only 249,707 acre-ft of water. By the end of 1952 this figure had increased to 1,400,000. Attention is called to the fact that this was a year of extensive rain-making activities. *Subject Headings:* **1. Rainfall 2. Artificial precipitation 3. Water resources 4. Arizona.**—*G.T.*

4.8–189 551.577.1:551.501.81

Twomey, S., **On the measurement of precipitation intensity by radar.** *Journal of Meteorology*, 10(1):66–67, Feb. **1953.** 2 figs., 9 refs. **MH-BH**—Precipitation rate R(mm/hr) is

lated to drop diameter D (mm) by $\Sigma ND^6 = 127R^{2.287}$. ΣND^6 is calculated from power of dar echo. Correlation of 0.89 but error of calculated precipitation rate may be considerable. *ubject Heading:* **1. Radar analysis of precipitation.**—*C.E.P.B.*

4.8–190 551.577.3(54)

Ranganatha, Rao A. (*Regional Met. Centre, Madras*), **A study of rainfall in Mysore State uring 1947–49.** *Indian Journal of Meteorology and Geophysics*, Delhi, 3(1):59–63, Jan. **1952.** figs., table, ref. **MH-BH**—The rainfall of this period is analyzed with a view of finding the xtent to which the failure of the northeast monsoon rains contributed to drought conditions Mysore State. A map of Mysore showing the two months in which heaviest rainfall occur each district, tables giving the normal rainfall for each month from June to Nov. inclusive nd the total rainfall, the percentage departure from normal for 1947, 1948 and 1949 and raphs showing the rainfall departure from normal in inches for each district are presented. he rainfall characteristics per year are discussed. *Subject Headings:* **1. Rainfall variations Mysore State, India.**—*I.L.D.*

4.8–191 551.577.3

Ramage, C. S. (*Royal Obs., Hong Kong*), **Variation of rainfall over South China through ie wet season.** *American Meteorological Society, Bulletin*, 33(7):308–311, Sept. **1952.** 2 figs., refs. **MH-BH**—The author attempts 1) to determine whether the secondary minimum in ong Kong rainfall occurring between July 4 and 15 and revealed in the 5-day means for 60 ears occurs elsewhere in South China, 2) to explain the normal march of rainfall over South hina during the wet season with the aid of 5-day means and 3) to determine the secular ability of the present rainfall pattern. Five-day means of rainfall for selected stations in outh China, smoothed by an overlapping method to minor deviations, show that a secondary ummer minimum of rainfall occurs throughout South China in the wet season. This mid-ummer dry spell is explained by the northward advance of the Pacific anticyclone so that the ai-u stream is intercepted and a high pressure and low rainfall prevails over South China. n the basis of an ancient Chinese farmers' calendar the author maintains that the rainfall attern of South China has changed little in the past 2000 years. *Subject Headings:* **1. Rainfall egime 2. Rainfall variations 3. South China.**—*I.L.D.*

4.8–192 551.577.36:629.13

Hong Kong. Royal Observatory, **Frequency distribution of summer rain durations at long Kong.** *Hong Kong. Royal Observatory, Technical Notes*, No. 4, Jan. 1, **1952.** 2 p. g. Article signed G.MA. Mimeo. **DWB**—A brief report on study of precipitation which ndangers flying by limiting visibility at Hong Kong. Associated synoptic situations are sted. *Subject Headings:* **1. Rainfall frequencies 2. Aeronautical meteorology 3. Hong ong.**—*M.P.K.*

4.8–193 551.577.36

Huttary, Josef, **Häufigkeit von trockenen und nassen Perioden in verschiedenen Kli-naten.** [Frequency of dry and wet periods in different climates.] *Germany. Deutscher Vetterdienst in der US-Zone, Berichte*, No. 42:77–82, **1952.** 14 tables, 14 refs. **DWB**—umerous calculations are made of lengths of unbroken and broken dry and wet periods 6 days up) at Potsdam, Viatka, Tomsk, Tashkent, Vladivostok and São Paulo. Dry periods re more frequent in sub-tropics than in mid-latitudes. *Subject Headings:* **1. Rainfall proba-ility 2. Drought.**—*C.E.P.B.*

4.8–194 551.577.38(54)

Drought in Madras State. *Indian Journal of Meteorology and Geophysics*, 3(4):237–239, Oct. **1952.** tables. **DWB**—Continued drought for the last 5 years (since 1947), attributed o atomic explosions and other human activities, resulted in a panic in the public mind. A ng series of rainfall records for Tamilnad (1870–1951) is analyzed in order to show that there as been no climatic change within the period of meteorological history. *Subject Headings:* **. Drought 2. Tamilnad, India.**—*A.A.*

4.8–195 551.577.38(74/75)

Klein, William H. (*U. S. Weather Bur., Ext. Fore. Sec.*), **The early summer drought of 1952.** *Weatherwise*, 5(5):111–113, Oct. 1952. 4 figs. **MH-BH**—The extent and severity of the early summer drought in the United States is described briefly and the mean sea level and 700 mb circulation for the Northern Hemisphere prevailing during this drought period are analyzed. The author concludes that "the presence of marked anticyclonic vorticity at 700 mb, the advection of warm dry air aloft, the absence of polar air masses, and the lack of storminess at sea level were the principal factors responsible for the combination of scorching heat and insufficient moisture which produced drought in the southern and eastern United States." *Subject Headings:* **1. Drought 2. Atlantic Coast States.**—*I.L.D.*

4.8–196 551.577.38(74/75)

Ludlum, David M., **Dog days of 1952.** *Weatherwise*, 5(5):114–117, Oct. 1952. **DWB**—Detailed accounts of temperature and rainfall conditions during the early summer drought of 1952 that prevailed largely over eastern and southern U. S. Data are given for New England, New York City, the southeast and Texas and also for South Dakota. A description of Hurricane "Able" is given. *Subject Headings:* **1. Drought 2. Atlantic Coast States.**—*I.L.D.*

4.8–197 551.577.38(73/9)

§Ludlum, David M., **The autumn drought of 1952.** *Weatherwise*, 5(6):138–141, Dec. 1952. 3 figs. **MH-BH**—Weather development over the U. S. during Sept. (characterized, as a whole, by drought) and Oct. 1952 ("driest on record in many sections east of the Rocky Mountains" and "the driest of any month of the year in Texas since observations started in 1888") and the synoptic situation of election day are described. U. S. Weather Bureau temperature and precipitation charts for Sept. and Oct. and the weather map for Nov. 4 are reproduced. *Subject Headings:* **1. Drought 2. United States.**—*G.T.*

4.8–198 551.577.38:63 551.506.2(44)

Sanson, J., **La sécheresse et la chaleur du printemps et de l'été 1947 et leurs conséquences agricoles.** [The drought and the heat of the spring and summer 1947 and their agricultural consequences.] *La Météorologie*, 4h. Ser., No. 9:40–56, Jan.–March 1948. 2 figs., tables. **DWB**—Describes the drought in France April 10–Oct. 20, 1947, and previous years 1941–1946. Maximum temperatures, indexes of aridity and duration of sunshine in 1947 also summarized. The agricultural yields varied from 19–68% of average. Periodicity of 18 years in hot summers and cold winters suspected. *Subject Headings:* **1. Drought 2. Agriculture 3. France.**—*C.E.P.B.*

4.8–199 551.577.38(438):551.543.5

Wiszniewski, Wacław, **Klimatologiszna chracterystyka suszy w Polsce w 1951 r.** [Climatological characteristics of the 1951 drought in Poland.] *Przegląd Meteorologyczny i Hydrologyczny*, No. 1/2:41–49, 1952. 5 figs. English summary p. 49. **MH-BH**—The author investigated the relation between weather conditions in Europe and the drought of 1951 in Poland. Graphs show seasonal and annual variations at Warsaw, geographical distribution of monthly mean values of temperature and precipitation over Poland, their departures from normals during 1951 and the pressure situation before and during drought period. *Subject Headings:* **1. Drought 2. Pressure variations 3. Poland.**—*N.T.Z.*

4.8–200 551.577.59

A jungle grows in Jersey. *Johns Hopkins Magazine*, 4(2):12–13, 28, Nov. 1952. photos. **DLC**—A popular description of the experiment being made by Dr. Thornthwaite at Seabrook, N. J., where 1200 in. of water has been sprinkled in a forested area each year (compared with 426 in. at the so-called wettest spot in the world—Cherrapunji, India). Three photographs show the phenomenal increase in undergrowth which has taken place since 1950 when the experiment started. Tests are being made by various government agencies to determine effect on ground water, soil conditions, fauna, flora, etc. of this "tropical" rainfall in a temperate zone forest. Rain gages are distributed throughout the forest where the industrial waste

vater is being disposed in this manner. *Subject Headings:* **1. Artificial rainfall influences . Rainfall effects 3. Plant ecology 4. Seabrook Farms, N. J.**—*M.R.*

HAIL AND RAIN

See also: **Raindrop size measurements** (Boucher), 4.8–54; **Method to measure raindrop size** (Smith), 4.8–56; **Polarization of light from illuminated areas in ceilometer beam during rain** (Jorgensen), 4.8–272; **Artificial radioactive matter in rain water, Paris** (Abribat and others), 4.8–273.

4.8–201 551.578.7

Tsuchiya, K. (*Yamanachi Univ.*), **On the hail damage in the vineyard of Kofu Basin.** *Journal of Agricultural Meteorology*, 7(2):65–67, June **1952.** 2 figs. English summary p. 67. **MH-BH**—An investigation of hail damage in a vineyard in the Kofu Basin indicates that the legree of damage was determined not only by the duration and magnitude of the hail storm ut also by topography, angle of inclination, direction of forward motion of hail storm, height f flower cluster, thickness of shoot and windbreaks. *Subject Headings:* **1. Hail damage . Viticulture 3. Kofu Basin, Japan.**—*I.L.D.*

4.8–202 551.578.71

Dight, F. H., **An unusually prolonged fall of "frozen drizzle."** *Meteorological Magazine*, London, 82(970):124–125, April **1953. DWB**—On Nov. 29, 1952, completely frozen pellets ell near London, alternating with rain, for 10 hours. *Subject Heading:* **1. Ice pellets.**—*C.E.P.B.*

4.8–203 551.578.71

Maier, Wilhelm, **Asterismus an Hagelkörnern.** [Asterism in hailstones.] *Meteorologische Rundschau*, 6(1/2):18–19, Jan./Feb. **1953.** 2 figs., 2 refs. **DWB**—A diagram drawn rom a photograph at Vicenza by flashlight shows large five-pointed hailstones. The origin s briefly discussed. *Subject Heading:* **1. Hail structure.**—*C.E.P.B.*

4.8–204 551.578.71

Puzanov, V. P. and Akkuratov, V. I., **K voprosu o mekhanizme obrazovaniia nekotorykh idov gradin.** [On the mechanism of formation of certain kinds of hailstones.] *Meteorologiia Gidrologiia*, No. 6:29–33, **1952.** 3 figs., 11 refs. **DLC**—Series of special experiments were arried out in the laboratory. It was found that the form, structure and conditions of falling f the hailstones are important factors for investigation of conditions under which hailstones re formed. Ice rain must be acknowledged as a winter form of hail. *Subject Heading:* **. Hail formation.**—*N.T.Z.*

4.8–205 551.578.71(54)

Rajeswara Rao, N. (*Nizam College, Hyderabad*), **A severe hailstorm at Hyderabad on 26 March 1951.** *Indian Journal of Meteorology*, Delhi, 3(1):69, Jan. **1952. MH-BH**—The adii of the layers of 25 hailstones measured by the author are given in a table. The diameter f the hailstones ranged between 1½ and 2½ inches. The number of layers ranged from 3 to 20. Nine of the stones were nearly spherical. *Subject Headings:* **1. Hail structure 2. Hailstone ize distribution 3. Hyderabad, India.**—*I.L.D.*

HYDROMETEOROLOGY

See also: **Agro-meteorological studies** (Unger), 4.8–24; **Chinook effect on snow cover and runoff** (Hoover), 4.8–152; **Soil and water depletion in relation to climatic change** (Tidmarsh), 4.8–230; **Forest and water balance, Harz** (Keller), 4.8–257.

4.8–206 551.579.5

Aldous, William M., Lawton, Warren L., and Mainfort, Robert C. (*U.S.C.A.A. Indianapolis*), **The measurement of soil moisture by heat diffusion.** *U. S. Civil Aeronautic Administration, Technical Development Report*, No. 165, April **1952.** 17 p. 13 figs., refs. **DWB**—

Operation of moisture measuring cell is based upon the principle that heat transmission through soil varies with moisture content of the soil. A porous block form of cell with an indirect measurement of soil moisture did not work properly. Better results were attained with a direct contact of the measuring unit with the soil and with a thermal conductivity form of cell in which the heating and temperature measuring elements were separated by the soil. *Subject Headings:* **1. Soil moisture measurement 2. Heat diffusion.**—*A.A.*

4.8–207 551.579.5:633.11

Gubanov, I.A. V., **Glubina proniknoveniia kornevoĭ sistemy iarovoĭ pshenitsy pri razlichnoĭ vlazhnosti pochvy.** [Depth of root system penetration of spring wheat under various soil moisture conditions.] *Vsesoiuznaia Akademiia Sel'skokhoziaĭstvennykh Nauk imeni V. I. Lenina, Doklady*, No. 7:15–19, **1952.** fig., 3 tables, 4 refs. **DLC**—Observations on growth of wheat root system were made during summer of 1950 and 1951. The wheat was sown after perennial grasses. Investigation showed that deep moistening of soil favored the continued growth of roots up to the earing stage. The roots of spring wheat cannot grow in layers where the soil moisture is lower than 16% *Subject Headings:* **1. Soil moisture 2. Wheat 3. Agricultural meteorology.**—*N.T.Z.*

4.8–208 551.579.5

Lossnitzer, H., **Einige Versuche zur elektrischen Bodenfeuchtemessung.** [Some attempts at electrical measurement of soil humidity.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:244–246, **1952.** 5 figs., 3 refs. **DWB**—Bouyoucos (1946) method of measuring soil moisture by varying conductivity of a gypsum block improved by Köhn and Person (1950) is examined and some results reproduced. *Subject Heading:* **1. Soil moisture measurement.**—*C.E.P.B.*

4.8–209 551.579.5

Maruyama, E. and Hayashi, K., **On the soil moisture in various fields.** *Japan. Central Meteorological Observatory, Tokyo, Memoir of Industrial Meteorology*, 16(1):45–46, Aug. **1952.** fig. In Japanese, English summary p. 3. **MH-BH**—Variations in soil moisture are graphically presented for six fields—unplanted, planted with various crops or covered with straw or rice hulls. The graph also shows corresponding precipitation amounts. Moisture data were measured at a depth of 5 cm. during the period May–Oct. 1951. *Subject Headings:* **1. Soil moisture 2. Mulch 3. Agricultural meteorology.**—*G.T.*

4.8–210 551.579.5:06

Miliukov, P. I., **Iz opyta obsluzhivaniia stroitel'stva Tsymlianskogo gidrouzla gidrologicheskimi prognozami i informatsieĭ.** [The experience of serving the construction of the Tsumliansk Hydraulic Network with hydrological forecasts and information.] *Meteorologiia i Gidrologiia*, No. 5:13–17, **1952.** 4 refs. **DLC**—Report on special hydrological service for the new hydraulic project near Tsymlianskaia (on the Don River) during 1950–1951. The chief problems of the service were forecasts and information on water levels and runoff, especially for the period of spring floods. Experiences in analogous work during construction of hydroelectrical stations at Volkhovo (near Leningrad) and on the Dniepr were utilized in planning the service. A special office gathered daily information transmitted by telegraph from 16–20 hydrological stations and received special weather and hydrological forecasts from the Central Hydrological Institute, Central Institute of Forecasting and from the Weather Bureau at Rostov-on-Don. Special observations were made from airplanes for more complete investigations of snow and ice conditions in the river basin before the spring flood. The spring flood of 1951 was near the highest level observed during the last 60–70 years and caused much trouble for the Hydrometeorological Service. Hydrological forecasts issued by Rostov Hydrometeorological Service 21 days before the date of the flood peak were very effective and the error was only about 2% of level range (the absolute error was +10 cm). *Subject Headings:* **1. Hydrometeorological services 2. Hydrologic forecasting 3. Spring floods 4. Don Basin 5. U.S.S.R.**—*N.T.Z.*

4.8–211 551.579.5:631.4

Prescott, J. A., **A climatic index for the leaching factor in soil formation.** *Journal of il Science*, Oxford, 1(1):9–19, March **1949.** p. 19. **DA**—Author plotted soil types in ıstralia against rainfall and saturation deficit at 390 stations. This gave a soil index $=P/(s.d.)^{0.7}$ where P is rainfall and *s.d.* saturation deficit, both in inches. A map of Australia ows K varying from 23 (desert) to 83 (red-brown earths and podzols). Comparison of P th evaporation E from a water surface and drainage D (all in inches) gave for $D=0$, P $1.14E^{0.80}$. The most efficient single-value climatic index is P/E^m; m varies from 0.67 to 0.80, ean 0.73. Values of 1.1–1.5 for this index correspond to the point where rainfall balances apotranspiration. *Subject Headings:* **1. Climatic indexes 2. Soil moisture 3. Australia.**—*E.P.B.*

4.8–212 551.579.5:632.115

Unger, K., **Bodenfeuchtigkeit und Asternwelke.** [Soil humidity and withering of asters.] *ngewandte Meteorologie*, 1(9):278–280, Feb. **1953.** 4 figs., table, 2 refs. **DWB**—Soil humidity easurements at 20–80 cm depth in an aster field in Quedlinburg in Aug. showed that the fected areas had low soil humidity. It is considered that in some way this helped the read of the infection. *Subject Headings:* **1. Soil moisture 2. Plant diseases.**—*C.E.P.B.*

4.8–213 551.579.5(66)

Walton, Kenneth, **The Aberdeen University expedition to Cyrenaica, 1951. Pt. II. ıe oasis of Jalo.** *Scottish Geographical Magazine*, 68(3):110–119, Dec. **1952.** 4 figs., 4 ıotos. **DWB**—Includes a brief account of the hydrography of the oasis with levels of underound water. *Subject Headings:* **1. Hydrography 2. Jalo Oasis, Cyrenaica.**—*C.E.P.B.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Course in climatology** (Alisov, Drozdov, Rubinshteĭn), 4.8–1; **Radiation balance of Alpine lake** (Sauberer), 4.8–113; **Shallowing age of lakes, Holstein** (Ohle), 4.8–233.

4.8–214 551.58:621.315.61:547.21

Haine, W. A., Smith, E. F. and Smith, N. R., **Weathering and crack resistance of black olyethylene for wire and cable.** *Electrical Engineering*, New York, 71(12):1113–1116, ec. **1952.** 13 figs., 10 refs. **DWB**—In studying the crack resistance and weathering characteristics of polyethylene, considerable data have been collected which are presented here. he controlling factors and their practical significance are described. *Subject Headings:* **Climatic effects 2. Electrical engineering 3. Insulation.**—*Authors' abstract.*

4.8–215 551.58:71(37)(09)

Kirk, William, **The geographical significance of VETRUVIUS' De architectura.** *Scottish eographical Magazine*, 69(1):1–10, April **1953.** 6 refs. **DLC**—The books of MARCUS ETRUVIUS POLLIO, who wrote on architecture in the early years of Augustus, include ideas ı climate and its effects, water supply, and town planning to take advantage of cleaning fect of winds. *Subject Headings:* **1. City planning 2. History of climatology. I. Vitruvius.**—*C.E.P.B.*

4.8–216 551.58(02)

†Miller, Arthur Austin (*Prof. Geogr., Reading Univ.*), **Climatology.** 7th ed. London, Iethuen, **1950.** 325 p. 82 figs., tables, refs. **DLC**—A textbook treatment of climatology om the point of view of climatic types rather than geographical regions. The environment each type is treated in general (normal conditions) and then local peculiarities are pointed ıt. The purpose of the book is to give geography students the rudiments of meteorology ıd its synthesis and relationship to human activity and the earth's landscape. If the student ishes to go deeper, he can consult the references at the end of each chapter. Chap. I. defines

climatology, II. the elements of climate, III. the factors of climate, IV. air masses, V. classifica tion of climate, VI. equatorial climatology, VII. tropical climates, VIII. monsoon, IX. weste margin warm temperatures, X. east margin warm temperatures, XI. cool temperature climat XII. cold, XIII. Arctic, XIV. desert, XV. mountain and XV. change in climate. This seventh edition contains on the last page of the last chapter two additional references not in the 194 edition—namely ZEUNER—"Dating the Past" (1946) and the "Pleistocene Period" (1943). For abstract of the 3rd ed. *see item* 6–83, June 1950, *MAB*. *Subject Headings:* **1. Climatology 2. Textbooks.**—*M.R.*

CLIMATOLOGY OF PARTICULAR PLACES

See also: **Microclimate investigation, Vienna Woods** (Sauberer), **4.8–237.**

4.8–217 551.582(612):63:626.8

Fisher, W. B., **Agriculture in modern Libya.** *Geographical Magazine*, 25(4):184–194, Aug. **1952.** 15 plates. **DLC**—Agriculture in this land of uncertain rains, the puzzling question of climatic fluctuations and possibilities of irrigation are discussed. *Subject Headings:* **1. Local climates 2. Agriculture 3. Libya.**—*C.E.P.B.*

4.8–218 551.582(262, 44, 45, 495):656.7

*Great Britain. Meteorological Office, **Aviation meteorology of the route Marseilles–Rome–Athens–Cairo.** *Great Britain. Meteorological Office, Meteorological Reports*, No. 12, **1953.** 68 p., 11 figs., 5 tables, 16 refs. M.O. 535 g. **GB-MO**—Pt. I. deals with the synoptic meteorology of the Mediterranean region, depressions and fronts, air masses, effect of topography, sirocco and sandstorms. Pt. II. describes the climate of the separate sections of the route, flying fitness, sea and swell, and local conditions at airfields. The major part of the work consists of detailed appendix tables, including general climate, visibility, height of cloud base, upper winds and head- and tailwinds. *Subject Headings:* **1. Aviation climatology 2. Mediterranean.**—*C.E.P.B.*

4.8–219 551.582(677)

†*Hunt, J. A., **A general survey of the Somaliland Protectorate 1944–1950 (Colonial Development and Welfare Scheme D.484).** Hargeisa, **1951.** 203 p. 6 plates, 48 figs., tables, numerous refs. **GB-MO**—Chap. 5 (p. 53–94, bibliog. p. 181–188) is on meteorology. The records of numerous stations are used in detailed statistical summary. Under "Rainfall," maps of average, maximum and minimum quarterly totals, and tables of monthly values for each year 1944–50 are given (49 stations), with some figures for earlier years, and dates of beginning of main ("Gu") rains. Temperatures include mean, maximum and minimum month temperatures and extremes. Winds are described and dates of wind seasons (NE and SW) tabulated. There is an extensive bibliography. Other sections in the book deal with situation and topography, geology, flora, fauna, and anthropology. *Subject Headings:* **1. Climat surveys 2. Somaliland.**—*C.E.P.B.*

4.8–220 551.582.1(54)

India. Meteorological Dept., **India's climates: summary for airmen. Summaries of climates of Afghanistan, Persia, Ceylon, Burma, Siam and Indo-China are also appended.** Poona, Pub. by the Govt., **1943.** 49+ p. 2 diagrs. Price: Re 1-0-0. **DWB**—Charts show relief and political divisions of area from Arabia to Indo-China, including all of the states of India and the important synoptic weather stations in this area. A general summary of the climatic conditions of the six regions of India is followed by short summaries of the sky conditions, number of days with rain, thunderstorms, visibility, fog, haze, winds at the surface and aloft for each region as a whole and then for various subdivisions of each region for each season, all arranged in systematic tabular form. *Subject Headings:* **1. Aeronautical climatology 2. Climate of India 3. Middle East 4. India 5. Persia 6. Ceylon 7. Southeast Asia.**—*M.R.*

4.8–221 551.582.3(54)

§India. Meteorological Dept., **Climatological atlas for airmen.** Poona, Pub. by the Govt., **1943.** 100 p. mostly charts. refs. and sources in text, p. III–IV. "Companion volume

o India's climates: Summary for Airmen," pref. p.i. Price: Rs 5-2. **DWB**—Charts were elected from "Climatic charts of India and neighborhood for meteorologists and airmen" hich was issued in a very limited edition by the Meteorological Dept. of India. New charts . number of rainy days, frequency of days with visibility more than 2½ miles, and upper winds t 0.5 km. level were added to those previously issued, namely: annual rainfall, normal dates of nset and petering out of the SW monsoon, number of cyclonic depressions crossing coast in 0 years (1891–1940), mean monthly pressure, prevailing wind, rainfall, thunderstorms, lust storms, overcast, fog and winds at 1, 2, 4, 6, and 8 km. The charts have been extended o Persia, Siam and Indo-China whenever possible. (*See item* 4.8–220 above.) *Subject Headings:* **1. Aeronautical climatology 2. Climate of India 3. Climatic atlases 4. India 5. Middle East 6. Southeast Asia. I. Normand, C. W. B.**—*M.R.*

4.8–222 551.582.2(54)

*India. Meteorological Dept., **Aviation climatological tables.** Bombay, Pub. by the Govt., **1944.** 70 p. mostly tables, map. Price: Re 8-8-0. **DWB**—Detailed tables are presented for surface and upper winds (16 points), temperature (daily maximum and minimum), rainfall, relative air density, cloud amount, frequency of low cloud amount and height, visibility, thunderstorms, fog, hail, dust and squalls for 70 selected stations in India and nearby Persia, Arabia, Ceylon, Burma, Siam and Indo-China. Data are arranged by stations, with monthly values for each element given under each station. *Subject Headings:* **1. Climatic data 2. Aeronautical climatology 3. India 4. Middle East 5. Southeast Asia.**—*M.R.*

4.8–223 551.582.1(81)

Monteiro, Carlos Augusto de Figueiredo (*Brazilian Nat. Council of Geography*), **Notas para o estudo do clima do Centrooeste Brasileiro.** [Notes for a study of the climate of central western Brazil.] *Revista Brazileira de Geografia*, Rio de Janeiro, 13(1):3–46, Jan./March **1951.** 23 graphs, 12 figs., bibliog. French, Spanish, Italian, English, German and Esperanto summaries p. 42–46. **DWB**—The article contains: a description of the physiography of this region; a discussion of the distribution of atmospheric temperature in relation to relief and annual and seasonal isotherms; of seasonal characteristics of the general circulation; of the distribution of rainfall; a climatic description on the basis of the Köppen classification; and a detailed discussion of the relationship between climatic types and the natural and cultural features of the region. Maps showing seasonal isotherms, number of days with rainfall per year, number of days of rainfall during the three dry months, index of humidity, climatic types and location of meteorological stations and graphical representation of the annual variations of temperature and rainfall for the individual meteorological stations are presented. *Subject Headings:* **1. Climate of Central Western Brazil 2. Brazil.**—*I.L.D.*

4.8–224 551.582.1(899)

Morandi, Luis, **Síntesis de las características fundamentales del clima del Uruguay.** [Summary of the basic features of the climate of Uruguay.] *Revista Meteorológica*, Montevideo, 11(39/40):197–207, Oct. **1951**/Jan. **1952.** **DWB**—This is in effect a "synthesis." Annual and seasonal means and extremes of temperature, pressure, humidity, wind, and rainfall, and days with thunderstorms, fog, hail and frost are cited and briefly discussed. BERGEIRO's isothermal and isohyetal maps of Uruguay are presented, as well as a table of annual frequencies of specified rainfall amounts of 10 stations. Both BERGEIRO and MORANDI have written penetrating studies of Uruguayan climate in the past; a more comprehensive climatology of the country would be welcomed, particularly if the results of observations published for first order stations since 1937 are incorporated. *Subject Headings:* **1. Climate of Uruguay 2. Climatic charts 3. Rainfall frequencies 4. Uruguay.**—*R. S. Quiros.*

CLIMATIC CHANGES

See also: **Warm summer 1952, Bamberg** (Brose), 4.8–130; **Importance of atmos. water circulation for past climate** (Schuh), 4.8–164.

4.8–225 551.583:631.4

†de Heinzelin, Jean, **Sols, paléosols et désertifications anciennes dans le secteur nord-oriental du bassin du Congo.** [Soils, ancients soils and ancient deserts in the N.E. sector

of the Congo Basin.] *Institut National pour l'Étude Agronomique du Congo Belge, Publication* **1952.** 168 p. 52 figs., 12 tables, 8 plates, 441 refs. **DWB**—This study was undertaken because of the influence of past climatic changes on the soils of the Congo Basin. Beginning with a study of geography, vegetation, climatic types, and geology over the whole central zone of Africa, author describes in detail the soil, subsoils and rocks of the upper Congo, with laboratory analyses. The effect of climatic changes on formation of laterite, ironstone, sand in Pleistocene, and the stratigraphy of Plio-Pleistocene is summarized. Climatic changes and their causes are examined on p. 130–136 and their effect on flora and fauna on p. 137–140. A very large bibliography is included. *Subject Headings:* **1. Climatic variations 2. Soil types 3. Congo Basin.**—*C.E.P.B.*

4.8–226 551.583:92

Gams, Helmut, **Lennart von Post als Quartärforscher.** [L. von Post as Quaternary investigator.] *Zeitschrift für Gletscherkunde und Glazialgeologie*, 2(1):91–93, **1952. DLC**—The Swedish professor L. VON POST was born June 16, 1884, died Jan. 11, 1951. He worked on beach movements and peat bogs, and initiated pollen analysis as a method of studying changes of Quaternary forests and climate. *Subject Headings:* **1. Biography 2. von Post, Lennart.**—*C.E.P.B.*

4.8–227 551.583

Genève, R., **Le climat à travers les ages.** [Climate through the ages.] *La Météorologie*, 4th Ser., 26:68–89, April/June **1952.** 13 figs., 9 refs. English, French, Spanish summaries p. 68. **MH-BH**—In Pt. 1 the evidence for climatic changes is described—glacier oscillations, pollen spectra, forams in ocean bottom cores, varves. Pt. 2 is a chronological account of climatic variations in geological epochs since pre-Cambrian. Pt. 3 weighs six distinct theories of climatic change and concludes that though information is not yet sufficient to decide between them, variations of cloudiness and atmospheric circulation are obviously important. *Subject Headings:* **1. Climatic variations 2. Glacial periods.**—*C.E.P.B.*

4.8–228 551.583(410)

Lamb, H. H., **British weather around the year—I. [and] II.** *Weather*, 8(5, 6):131–136; 176–182, May, June **1953.** fig. **MH-BH**—Spells of 25 days or more of the same type of weather occur most frequently in distinct periods. These suggest division of year into: High summer, June 18–Sept. 9; Autumn, Sept. 10–Nov. 19; Early winter, Nov. 20–Jan. 19; Late winter–early spring, Jan. 20–end of March; Spring and early summer, end of March–June 17. Pt. 2 gives daily frequencies of anticyclonic, W, NW, N, E and S types 1898–1947 and discusses the "singularities" associated with their variations. *Subject Headings:* **1. Seasonal variations 2. Singularities 3. Great Britain.**—*C.E.P.B.*

4.8–229 551.583

†Manley, Gordon, **Reviews of modern meteorology—9. Climatic variation.** *Royal Meteorological Society, Quarterly Journal*, 79(340):185–209, April **1953.** 6 figs., 2 tables, 100 refs. **DWB**—A general discussion of the problems of climatic change, especially in Europe, on the lines that recent changes are the key to those of the past. The degree of cooling during various stages of the Quaternary glacial period is considered and different estimates compared. Changes of temperature of the order of 200–900 years since the Climatic Optimum are about 2°F and are comparable in range with recent short-period changes. Recent compilations of mean monthly and annual temperature and annual range since about 1750 smoothed over 10 years, show fluctuations of about 1°F in W. Europe. Changes since about 1000 A.D. are regarded as comparable. *Subject Headings:* **1. Climatic variations 2. Review articles.**—*C.E.P.B.*

4.8–230 551.583:551.579

Tidmarsh, C. E. M. (*Middleburgh, So. Africa*), **The depletion of soil and water resources in relation to climatic change.** *Soil and Fertilizers*, Harpenden, England, 14(6):427–431, Dec. 1, **1951.** 14 refs. **DA**—Author challenges the view that soil depletion and erosion are due entirely to human activities. He considers that spread of desert vegetation in S. Africa

is partly due to widespread change towards warmer, drier climate and only partly to human activity. *Subject Headings:* **1. Soil erosion 2. Water resources 3. Human activity 4. Vegetation influences 5. Climatic variations.**—*C.E.P.B.*

4.8–231 551.583.13

Wahl, Eberhard W., **Singularities and the general circulation.** *Journal of Meteorology*, 10(1):42–45, Feb. **1953.** 3 figs., 14 refs. **MH-BH**—Singularities at Boston 1899–1939 are compared for months of high and low zonal circulation index. Warm spell ("January thaw") Jan. 20–23 and subsequent drop, and peak of rain occurrence June 5–10 are developed only in low index months. Rainday peak Sept. 17–18 occurs only in high index months. Singularities are therefore related to variations of the general circulation. *Subject Headings:* **1. Singularities 2. Boston, Mass.**—*C.E.P.B.*

4.8–232 551.583.14

Brown, P. R., **Climatic fluctuations in the Greenland and Norwegian Seas.** *Royal Meteorological Society, Quarterly Journal*, 79(340):272–281, April **1953.** 9 figs., 5 tables, 10 refs. **DWB**—Hollerith cards (160,000) for 5° squares in 60–70°N were used to compute decadal mean air and sea temperatures (year, July, Dec.–March) 1900–1949. Air temperatures mostly show a general rise up to 1930–39, irregular changes in next decade. Sea temperatures mostly show a rise throughout. The fluctuations from decade to decade in the eastern and western parts are dissimilar. *Subject Headings:* **1. Climatic trends 2. North Atlantic.**—*C.E.P.B.*

4.8–233 551.583.14:551.481:576.8

Ohle, Waldemar, **Der Vorgang rasanter Seenalterung in Holstein.** [The progress of shallowing with age of lakes in Holstein.] *Naturwissenschaften*, 40(5):153–162, March, **1953.** 9 figs., 66 refs. **DWB**—The decomposition of organic material on the lake bed depends on oxygen, temperature and bacterial activity. In the Gt. Plöner Lake there has been a marked decrease of O_2 and increase of H_2S in recent years. The cause is partly increased surface temperature in spring leading to greater stagnation, but mainly an increase in the nitrogen and phosphorus compounds carried into the lake from surrounding fields, due to increased use of fertilizers and to increased rainfall. These have increased bacterial activity. *Subject Headings:* **1. Climatic trends 2. Lakes 3. Holstein, Germany.**—*C.E.P.B.*

4.8–234 551.583.2:551.311.12

Lliboutry, Louis, **More about advancing and retreating glaciers in Patagonia.** *Journal of Glaciology*, 2(13):168–172, April **1953.** 3 figs., 4 refs. English and French summaries p. 168. **GB-MO**—Recent observations in South Patagonia show that Moreno glacier and some others have recently advanced or are stationary. Glaciers which are retreating are fed from snowfields through narrow passes, which entails a lag of 20–50 years. Climate is said to have become less cold but wetter and cloudier during past 20 years. *Subject Headings:* **1. Glaciers 2. Patagonia, South America.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Course in climatology** (Alisov, Drozdov, Rubinshteĭn), 4.8–1; **Phenology: aid in microclimatological cartography** (Uhlig), 4.8–44.

4.8–235 551.584

Brunt, Sir David, **Bases of micro-climatology.** *Nature*, London, 171(4347):322–323, Feb. 21, **1953.** 2 tables, 5 refs. **DLC**—Summary of a lecture. Deals briefly with temperature of bare soil with air spaces, dry or partly filled with water, effect of vegetation (grass, rye, antirrhinum, forest), effect of slopes, aspect and nearness of water surfaces. *Subject Heading:* **1. Microclimatology.**—*C.E.P.B.*

4.8–236 551.584:771:551.582:71

Sauberer, Franz, **Kleinklima-Untersuchungen im Breitenfurter Becken (Wienerwald).** [Microclimate investigations in Breitenfurt basin (Vienna Woods).] *Wetter und Leben*,

4(8):122–127, Sept. **1952.** 3 figs., 4 refs. **MH-BH**—The application of microclimatological considerations in urban planning with particular reference to Vienna as discussed and illustrated by microclimatological study of the Breitenfurt basin (southern part of Vienna Woods). A map showing variation of insolation, occurrence of inversions and accumulation of cold air in the settled area is given; and the topographic variation in air temperature, relative humidity, cloudiness and wind is analyzed and the suitability of the area for occupance is evaluated microclimatically. *Subject Headings:* **1. Microclimatological research 2. Town planning 3. Urban climatology 4. Vienna, Austria.**—*I.L.D.*

4.8–237 551.584.34:551.511

Miller, David H., **Micro-meteorological conditions over snow pack in open forest: preliminary report on factors influencing convective heat-exchange.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin No. 11, Aug. 29, **1950.** 17 p. 3 tables, graph. **DWB**—Comparative data are presented on temperature in the lower layer of the atmosphere with and without snow cover. The observations were made at the Central Sierra Snow Lab. between Feb. 1946 and Nov. 1948. Purpose of the study was to determine the effect of snowpack on the amount of convective heat exchange. It was found that during low-sun periods snow cover has no noticeable effect on the intensity of temperature inversions but during the middle of the day 4-ft temperature lapse rate averages 1° over snow cover as opposed to 3° over bare ground. Effects of wind, turbulence, humidity, etc. are discussed. *Subject Headings:* **1. Convective heat exchange 2. Snow cover 3. Micrometeorology 4. Central Sierra Snow Laboratory. I. Project CW-171 II. U. S. Corps of Engineers.**—*G.T.*

4.8–238 551.584.41

Aulitsky, Herbert, **Forstmeteorologische Untersuchungen an der Wald- und Baumgrenze in den Zentralalpen.** [Forest meteorological investigations at the forest and tree limit in the central Alps.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* 4(3):294–310, **1953.** 4 figs., 5 tables, 13 refs. German, English, French summaries p. 294–295. **MH-BH**—Autographic records of temperature and humidity, and some evaporimeter measurements, in planted woods, thicket and in the open near tree limit at 1400–1900 m 10 km SW of Innsbruck, are described and illustrated. Even light woods have a much more uniform climate than open ground, conserving the soil and maintaining a moisture reserve especially valuable to young trees. The effect of general weather increases with altitude owing to more open vegetation. This and exposure to prevailing winds governs the distribution of trees—larch, stone pine, spruce and, in depressions, thickets—which in turn affects the local climate, especially the evaporation. *Subject Headings:* **1. Forest influences 2. Forest microclimatology 3. Forest limits 4. Austria.**—*C.E.P.B.*

4.8–239 551.584.41:551.588.6(497.1)

Wraber, M. (*Ljubljana, Yugoslavia*), **O snačaju i zadacima meteorološke službe za šumarstvo.** [The importance and responsibilities of the meteorological service for forests.] *Yugoslavia. Hydrometeorološka Služba, Hidrometeorološki Glasnik,* 2(1–2):68–79, **1949.** 9 refs. In Croatian. **DWB**—Synoptic elements which have an effect on the growth of plants, such as temperature, radiation, precipitation, air humidity and wind, and some microclimatological factors are discussed. The effect of forest vegetation on climatic conditions is mentioned. Possibilities of a contribution of forest services to meteorological observation programs are considered. Characteristics of the climate and vegetation of Slovenia are summed up. *Subject Headings:* **1. Forest microclimatology 2. Plant ecology 3. Forest influences 4. Yugoslavia.**—*G.T.*

4.8–240 551.584.43:634.9

Sakharov, M. I., **Zavisimost' temperatury stvolov sosny ot tipov lesa.** [Temperature of pine tree stems influenced by the type of forest.] *Akademiia Nauk SSSR, Doklady,* Moscow, 85(6):1373–1376, Aug. 21, **1952.** 3 tables, 9 refs. **DLC**—Report on special observations made at Briansk Experimental Forest during 1939–1940 in three pine woods of different phytocenoses. Temperatures of tree stems (taken at 2 cm depth in stem at height of 1.3 m above soil surface), of the air (2 m above soil surface) and of the soil (at depth of 5 cm) were

collected for each day of the growing season. Measurements were made at 7, 13 and 19 hrs. The observations throughout the winter were irregular. The highest temperatures of stems were observed in pine forest with moss and lichen, and the lowest in pine forest with whortleberry bushes (mean stem temperatures taken at 13 hrs during the growing season were 16.1° and 13.9°C, respectively). The stems were usually warmer than the air in the morning and colder at day and evening hours. On hot summer days the differences reached 4–6°C with the extreme difference to 10°C. The stem temperatures increased with the increasing height above surface. The low thermal conductivity of wood cells caused moderate oscillations of temperature inside the trees and diminished thermal differences between the parts of the tree exposed and unexposed to sunshine. The temperature of lower parts depends also on temperatures of water gained by tree from the soil. *Subject Headings:* **1. Pine forests 2. Forest microclimatology.**—*N.T.Z.*

CLIMATIC CLASSIFICATION

4.8–241 551.585

†Lauer, Wilhelm, **L'indice xérothermique. Zur Frage der Klimaindizes.** [The xerothermic index. On climatic indexes.] *Erdkunde*, 7(1):48–52, **1953.** 34 refs. In German, English summary p. 48. **DLC**—Schemes of climatic classification and climatic indexes are summarized, from DE MARTONNE to THORNTHWAITE. Climatic indexes based on annual means are unsatisfactory; those based on numbers of dry or humid months are more nearly applicable to vegetation belts in the tropics, but author favors an index based on summation of "dry days" which are weighted according to relative humidity, with half weight for days of mist or dew. Relations to vegetation types are tabulated. *Subject Heading:* **1. Climatic classifications.**—*C.E.P.B.*

4.8–242 551.585

Villmow, Jack Richard (*Wellesley Col.*), **The position of the Köppen Da/Db boundary in Eastern United States.** *Association of American Geographers, Annals*, 42(1):94–97, March **1952.** 4 figs., 5 refs. **DWB**—Based on data for 20 Canadian and 81 U. S. first order stations east of the 100th meridian, the position of the Köppen Da/Db boundary for each year (1935–50 and 1920–34, respectively) is plotted. Extreme year to year variability makes author's conclusion that original position of line was too far south (0 to 200 mi) rather pointless, although author's line seems more realistic than earlier position. Nevertheless, in a region where climatic variations are greater from year to year than normally found over wide latitudes, any such artificial "boundary" is of purely academic interest. *Subject Headings:* **1. Climatic regions 2. Köppen's classification 3. Eastern United States.**—*M.R.*

4.8–243 551.585.53(54)

Pramanik, S. K., Hariharan, P. S. and Ghose, S. K. (*Met. Off., Poona*), **Meteorological conditions and the extension of the Rajasthan Desert.** *Indian Journal of Meteorology and Geophysics*, 3(2):131–140, April **1952.** 12 figs., 2 tables. **MH-BH**—Boundaries of arid and semi-arid regions of India discussed according to the classification of KÖPPEN, THORNTHWAITE and DE MARTONNE; 70–80 years of observations show an appreciable change in meteorological factors. *Subject Headings:* **1. Climatic variations 2. Climatic classifications 3. Arid zones 4. Rajasthan Desert, India.**—*A.A.*

BIOCLIMATOLOGY

See also: **Meteorobiology of man** (de Rudder), 4.8–7; **Nutrition and climatic stress** (Mitchell, Edman), 4.8–14; **Bibliography on radiation bioclimatology,** p. 925–958.

4.8–244 551.586:612(494)

*Bider, Max (*Basel*) and Thams, J. Chr. (*Locarno-Monti*), **Die Schwüle meteorologisch betrachtet.** [Sultriness examined meteorologically.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, **1950.** p. 151-152. Abstracted from reprint. **DWB**—Assuming that when the vapor pressure is $\leq$14.1 mm a man at rest feels "Schwüle" (sultriness), a critical analysis is made of records at Basel and Milan to show the number of sultry days in each month (1930-49), frequency of varying degrees of sultriness, effect of various methods of

measuring humidity on statistics obtained: (at Locarno-Monti in 1948–9 there were recorded 62 sultry days with a ventilation psychrometer, 28 with a hygrograph and 15 with a hygrometer); diurnal effects (in Basel it is usually around noon that V.P. $\leq$14.1 mm, while in Milan it stays sultry all day), and frequency of hail, thunderstorms and high temperatures on sultry days or vice versa. *Subject Headings:* **1. Sultriness data 2. Basel, Switzerland.**—*M.R.*

4.8–245 551.586:612

Brunnhölzl, K., Schedel, F. and Ungeheuer, H., **Schmerzempfindung und Wetter.** [Pain sensitivity and weather.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(3):317–326, **1953.** 5 figs., 21 refs. German, English, French summaries p. 317. **MH-BH**—Using the "Algimeter" (pain threshold meter acting through a manometer) measurements were made twice daily on 16 patients at Munich. Results are plotted in relation to room climate, air mass, passage of fronts, atmospheric electricity and "relative biological weather" (RBW). RBW is calculated from absolute values and changes of 10 meteorological indicators, and its interdiurnal variation has a close correlation with pain sensitivity both in sick and healthy subjects. *Subject Heading:* **1. Weather sensitivity.**—*C.E.P.B.*

4.8–246 551.586:612.2:551.594

†Reiter, Reinhold, **Neuere Untersuchungen zum Problem der Wetterabhängigkeit des Menschen.** [Recent investigations in the problem of human weather dependence.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(3):327–377, **1953.** 14 figs., 5 tables, 75 refs. German, English and French summaries p. 327–329. **MH-BH**—The difficulties of biometeorology are discussed, including the need for comprehensive material and the obscure geophysical elements involved. The more important earlier work is summarized. The time variations of atmospheric electric processes and their rate of penetration into closed rooms are discussed, conductivity of metal-free walls being assessed as $<10^{-14}$ CGS. The setup at Munich and observations in Bavaria in various weather types are described and illustrated. It is concluded that suitable biometeorological indicators are variations of the static electric field and waves in ranges: A, 10–50 kH; B, 4–12 kH. A occurs with thunder within 500–1000 km, B with moist-labile stratification of the atmosphere, especially at night. These are related to biological effects, e.g., recovery from operations, birth rates, suicides, traffic accidents. The clinical importance of these indicators is shown by some high correlation coefficients. *Subject Headings:* **1. Weather sensitivity 2. Atmospheric electricity.**—*C.E.P.B.*

4.8–247 551.586:616

Ungeheuer, H., **Ein biometeorologisches Experiment.** [A biometeorological experiment.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:125–128, **1952.** fig., 3 refs. **DWB**—Disturbance in electromagnetic long waves in otherwise undisturbed weather on July 2–3, 1952, was accompanied by marked but not rare pathological symptoms in Bavarian hospitals. Author doubts a connection but suggests further research. *Subject Heading:* **1. Medical meteorology.**—*C.E.P.B.*

4.8–248 551.586:616

Wada, H. (*Aomori Weather Station*), **Infantile paralysis and atmospheric phenomena.** *Geophysical Magazine*, Tokyo, 23(1):55–58, Dec. **1951.** 2 figs., 3 tables. **MH-BH**—Infantile paralysis seems to break out when an atmospheric depression is passing (level of significance 5%). Most frequent occurrence from June to Aug. Comparison with observations in the United States shows that the disease is often connected with high humidity in July. *Subject Headings:* **1. Medical meteorology 2. Poliomyelitis 3. Barometric depressions.**—*A.A.*

4.8–249 551.586:616:551.556

†Warmbt, W., **Meteoropathologische Beobachtungen in Dresden bei Südsüdost-winden.** [Meteoropathological observations in Dresden during SSE winds.] *Angewandte Meteorologie*, Berlin, 1(8):244–255, Dec. **1952.** 8 figs., 4 tables, 34 refs. **MH-BH**—Persistent SSE winds at Dresden are strong squally katabatic currents ("jets") between Erzgebirge and Lausitz mountains, usually associated with subsidence inversions of quasistationary anticyclones over Balkans; average duration 61 hrs. Their topographic cause and aerology are discussed; they resemble föhn winds. Their biotropic effect is shown by the coincidence of gall colic and gallstone pains with greatest velocity of SSE winds. The example of March 8–9, 1952, is discussed in detail. Following P. Courvoisier the biotropic effect is attributed, as with föhn, to

subsonic pressure variations acting through the ear. *Subject Headings:* **1. Medical meteorology 2. Wind effects.**—*C.E.P.B.*

4.8–250 551.586:616:551.515.8

Whiten, Alfred J., **Rheumatism and fronts.** *Weather*, 8(1):10–13, Jan. **1953.** table, 6 refs. **MH-BH**—Comparison of records at 6 hr intervals of rheumatic subjects with passage of warm and cold fronts and occlusions gave no definite result. Relation of rheumatism to excess water is briefly discussed. *Subject Headings:* **1. Weather sensitivity 2. Rheumatism 3. Fronts.**—*C.E.P.B.*

4.8–251 551.586:616.12

Becker, F., **Arbeits-Angina pectoris und Wetter.** [Strained heart and weather.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 8:21–24, **1953.** fig., 3 refs. **DWB**—Reactions of a heart patient at Königstein to synoptic types—upglide, turbulence, no disturbance—were studied statistically. The first two were associated with increased heart attacks. *Subject Headings:* **1. Bioclimatology 2. Heart disease.**—*C.E.P.B.*

4.8–252 551.586:616.12:519.2

Zink, Otto, **Über die Beeinflussung der Hypertonie und Herzinsuffizienz durch Wetterfaktoren.** [On the effect of weather factors on hypertonia and heart weakness.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 8:95–98, **1953.** 3 tables. **DWB**—Hypertonics and cases of weak muscular heart action investigated at Hamburg are especially subject to the influence of upglide weather and equivalent temperature, but contingency coefficients and chi-square test show only weak correlations. *Subject Headings:* **1. Bioclimatology 2. Heart disease 3. Statistical analysis.**—*C.E.P.B.*

4.8–253 551.586:616.15

Leistner, Walter, **Der Verlauf individueller Leukozytenkurven in Abhängigkeit vom Witterungsgeschehen.** [The course of individual leucocyte curves in relation to weather phenomena.] *Annalen der Meteorologie, Medizin Meteorologische Hefte*, No. 8:24–39, **1953.** 7 figs., 4 tables, 2 refs. **DWB**—Describes in detail a research into the relation between synoptic weather situations and number of white corpuscules in blood of children and grown-ups. Three different types of reaction were found. *Subject Headings:* **1. Bioclimatology 2. Anemia.**—*C.E.P.B.*

4.8–254 551.586:636.2

Asker, A. A., Ragab, M. T. and Ghany, M. A. (*Fouad I Univ., Cairo*), **Some factors affecting heat tolerance of cattle and buffaloes.** *Nature*, London, 171(4363):1074, June 13, **1953.** table, 3 refs. **DWB**—Describe results of experiments on Egyptian cattle, buffaloes and Shorthorn grades, lactating, 2 year and 1 year, at air temperatures 91–98.6°F, R.H. 42–68%. Body temperature of buffaloes increased with exposure to summer sun, other cattle not affected. *Subject Heading:* **1. Animal husbandry.**—*C.E.P.B.*

UPPER AIR CLIMATOLOGY

4.8–255 551.587:06

Tateno, Japan. Aerological Observatory, **Upper air research meeting for 30th anniversary celebrations [of the Aerological Observatory of Tateno].** *Tateno. Japan. Aerological Observatory, Journal*, 5(1):93–98, March **1951.** refs. **DWB**—Aerological Observatory at Tateno established in 1920 by W. Ooishi. Nineteen papers were presented at the meeting, held in Nov. 1950. Seven papers will be abstracted separately. *Subject Headings:* **1. Aerological conferences 2. Tateno, Japan.**—*A.A.*

ENVIRONMENTAL INFLUENCES

See also: **Advection fog, effect of woods on fog reduction** (Imahori), 4.8–176; **Meteorological service for forests** (Wraber), 4.8–240.

4.8–256 551.588.6:551.579

†Keller, Reiner, **Wald und Wasserhaushalt. Die Bedeutung neuer Versuche im Harz.** [Forest and water balance. The importance of recent research in the Harz.] *Erdkunde*,

7(1):52–57, 1953. fig., tables, 20 refs. English summary p. 52. **DLC**—After a summary of the history and problems of effect of deforestation on water balance, author describes an investigation with raingages and flow gages in 5 small adjacent areas (2 forested, 2 young growth, one deforested) in the Harz south of Goslar. Complete deforestation lowers evapotranspiration and increases runoff; forest cover alters annual variation of runoff; it does not increase it in dry periods, it generally but not always minimizes floods. Proposals for future work are set out. *Subject Headings:* **1. Forest influences 2. Hydrology.**—*C.E.P.B.*

4.8–257 551.588.7

†Khromov, S. P., **Klimat v stalinskom plane preobrazovaniia prirody.** [Climate in the Stalin plan for changing nature.] *Leningrad. Universitet, Vestnik*, No. 4:3–29, 1951. bibliog. **DLC**—The Stalin plan for changing nature is a popular name for a program of soil conservation, irrigation, afforestation, watershed management, agricultural methods, etc. and the construction of hydroelectric stations, established in 1948. The author discusses the possibilities for changing the climate near the ground in different climatic regions of the Soviet Union. A series of papers by Russian scientists is mentioned, beginning with Voeĭkov, who first made plans of climatic improvements for agricultural purposes. *Subject Headings:* **1. Climatic amelioration 2. Soil conservation 3. U.S.S.R.**—*A.A.*

4.8–258 551.588.7

Rakhmanov, V. V., **Hydrologiske og meteorologiske figer av menneskets indring av naturforholdene i Sovjet-Samveldet.** [Hydrological and meteorological results of man-made changes of the natural conditions in the USSR.] *Naturen*, 76(17):529–544, **1952. DWB**—An article translated from Russian into Norwegian. Explains the task of cultivating not less than twenty million km² of land in the U.S.S.R. by planting forests and changing the courses of rivers, thereby achieving a man-made climate. A map showing the climate as modified by shelter belts and the 8 regions where shelter belts are being planted is given. The project will be carried out under the Michurin plan. *Subject Headings:* **1. Climatic amelioration 2. Shelter belts 3. U.S.S.R.**—*W.N.*

SYNOPTIC CLIMATOLOGY

4.8–259 551.589.5:629.13(771)

*Farthing, E. D., **A summary of ceilings and visibilities versus wind direction and speed for Greater Cincinnati Airport, Cincinnati, Ohio (Erlanger, Kentucky), April 1947 through March 1952.** Trans World Airlines, Inc., Oct. 9, **1952.** 18 p. 8 tables, 6 plates. **DWB**—This report consists mostly of data presented in tabular and graphical form. They are based on hourly observations during the period indicated in the title. The data include frequency and probable occurrence of various degrees of wind speed, wind direction, visibility, ceiling and freezing precipitation. Probability values of different ceiling heights as functions of various wind speed and direction are also offered. Data on number of hours below certain operating minima are presented. *Subject Headings:* **1. Airports 2. Synoptic climatology 3. Cincinnati, Ohio.**—*G.T.*

MISCELLANEOUS APPLICATIONS

COSMIC INFLUENCES

See also: **Solar radiation during partial eclipse, Feb. 25, 1952** (Schedler), 4.8–121.

4.8–260 551.590.21:551.577.3

Toelle, Hans (*Halle/Saale*), **Sonneflecken- und Niederschlagsmessungen. Pt. I and II.** [Sunspots and rainfall measurements. Pt. I and II.] *Hallische Monographien*, Halle, No. 16:31–38, **1950;** No. 22:19–32, **1951.** tables, figs., refs. **DLC**—Rainfall data for 16 stations (1851–1950) in Germany (or formerly in Germany) are correlated with sunspot relative numbers and, with notable exceptions, a good relationship is shown. Drought years are also correlated with relative sunspot numbers. Results are shown in graphs and tables. In the second article the author goes into many of the refinements of solar prominences,

sunspot groups, etc. that might affect terrestrial weather, and the mechanism through which the influences could operate to produce heavier rainfall or drought. Continental, oceanic, mountain and other local influences that could affect precipitation are also recognized. Conclusion is that one year before the minimum of the smoothed sunspot curve the precipitation is at maximum and one year before the minimum the solar corona has a distinctly observed minimum form. *Subject Headings:* **1. Solar influences 2. Rainfall variations 3. Drought 4. Sunspot cycles.**—*M.R.*

4.8–261 551.590.21

Troeger, Heinz, **Der Einfluss der Sonnentätigkeit auf die Witterung.** [The influence of solar activity on weather.] *Meteorologische Rundschau*, 6(1–2):19–20, Jan.–Feb. **1953.** 2 figs., 8 refs. **DWB**—Areas of faculae F are plotted against sunspot relative numbers L and differences $L-L_1$ from best fitting straight line taken as a measure of lack or excess of sunspots. Various meteorological phenomena were plotted against F as ordinate and $L-L_1$ as abscissa (winter temperature anomalies illustrated), showing that neither faculae nor sunspots alone are effective agencies, but both together. *Subject Heading:* **1. Solar influences.**—*C.E.P.B.*

4.8–262 551.590.25:621.396.11

Kaiser, T. R. and Greenhow, J. S., **On the decay of radio echoes from meteor trails.** *Physical Society of London, Proceedings, Ser. B*, 66(2):150–151, Feb. 1, **1953.** 5 refs. **DWB** The hypothesis of J. FEINSTEIN that long duration echoes from meteor trails are due to initial shock-wave expansion of the trail is rejected in favor of the authors' diffusion theory, and fluctuations are attributed to trail distortion by upper winds. *Subject Headings:* **1. Meteor trails 2. Reflection echoes.**—*C.E.P.B.*

VISIBILITY

4.8–263 551.591.1:551.576.1 551.594.7

Atlas, David and Bartnoff, Shepard, **Cloud visibility, radar reflectivity, and drop-size distribution.** *Journal of Meteorology*, 10(2):143–148, April **1953.** 2 figs., 5 tables, 11 refs., 10 eqs. **MH-BH**—In W. TRABERT's 1901 visibility equation $V=(C\rho r)/W$ where V is in meters, r is mean drop radius (microns), W liquid water content in g/m³ and ρ density of scattering material, C has preferred values of 3.3–4.8 for different cloud types. A better expression is $V=(K\rho d_0)/W$ where d_0 is median drop diameter and K, about 1.2, is nearly independent of drop-size spectrum in natural clouds. The radar-reflectivity factor Z is given by $Z=(6/\pi)G(n)d_0^3(W/\rho)\times 10^{-6}$, where $G(n)=1.35$. *Subject Headings:* **1. Visibility in clouds 2. Radar meteorology.**—*C.E.P.B.*

4.8–264 551.591.1:551.593

Shibata, Y. (*Nahoya Local Met. Obs.*), **The theoretical investigation on the optical nature of particles of haze and some results of visibility observations taken in fog.** *Geophysical Magazine*, Tokyo, 23(1):73–102, Dec. **1951.** 11 figs., 6 tables. **MH-BH**—Comprehensive study on scattering, absorption, flux density of light and the relation between visibility and the radius and number of particles in fog, the size and color of the object and the contrasts with different objects. Relation between ion-ratio and visibility in sea fog discussed. Special formulas given for the scattering in the horizontal direction near the earth and for bird's eye visibility. *Subject Headings:* **1. Visibility in fog 2. Atmospheric optics.**—*A.A.*

OPTICAL PHENOMENA

See also: **Statistical basis of theory of stellar scintillation** (Chandrasekhar), 4.8–143; **Optical nature of haze particles . . .** (Shibata), 4.8–264.

4.8–265 551.593.11

Kohl, G., **Erklärung einer Luftspiegelung nach oben aus Radiosondierungen.** [Explanation of superior mirage by means of radiosonde data.] *Zeitschrift für Meteorologie*, 6(11):344–348, Nov. **1952.** 4 figs., 4 refs. **MH-BH**—A frequently observed superior mirage at Fichtelberg involves the dome shaped mountain tops on the Czechoslovak-Bavarian bound-

ary. The mirage observed on Nov. 28, 1950 is explained quantitatively with the use of radiosonde data obtained at Erlangen and Dresden on the same date and the various mirage theories of A. WEGENER, PERNTER-EXNER and SCHIELE. *Subject Heading:* **1. Superior mirages.**—*I.L.D.*

4.8–266 551.593.12:551.524.1

Crain, C. M.; Deam, A. P. and Gerhardt, J. R., **Measurement of tropospheric index-of-refraction fluctuations and profiles.** *Institute of Radio Engineers, N. Y., Proceedings*, 41(2): 284–290, Feb. **1953.** 8 figs. **DLC**—Simultaneous records of index-of-refraction and of temperature fluctuations over the sea and over coastal areas near Lakehurst, N. J., are presented. They were obtained in April 1951 by means of a microwave refractometer and a bead-type thermistor carried by a Navy Type M airship up to 5,000 ft. Index of refraction fluctuations appear to be primarily due to fluctuations in air moisture content. Records showing refractive index profiles and fluctuations are also presented for Dayton, Ohio. These were obtained in June 1951 with a refractometer carried up to 11,000 ft in a Type C-46 aircraft. Some details of the meteorological conditions prevailing during the flights are mentioned, like the fact that whenever rough air was encountered, the index of refraction showed rapid variations of large amplitude, the reverse not being necessarily the case. In general, tropospheric index of refraction fluctuations are found to vary greatly with time and space. *Subject Headings:* **1. Atmospheric refraction 2. Temperature microvariations.**—*G.T.*

4.8–267 551.593.5

Piaskovskaia-Fesenkova, E. V., **Nekotorye dannye ob atmosfernoĭ indikatrise rasseianiia sveta.** [Some data on the atmospheric indexes of the scattering of light.] *Akademiia Nauk SSSR, Doklady*, 86(5):921–924, **1952.** 2 figs., 4 eqs. **DLC**—The function $f(\vartheta)$ in the relation $\mu = \sigma f(\vartheta)$ is called by the author—the "relative" index of light scattering, μ—scattering coefficient angle of scattering. Measurements show that $f(\vartheta)$ has a characteristic form for the aerosol layer of the atmosphere, probably independent of meteorological conditions. A table gives $f(\vartheta)$ and $a = \mu/\tau$ for 476 and 625 mμ and the Raleigh scattering for ϑ from 15° up to 160°. τ—optical thickness of the atmosphere. Analytical expressions for $f(\vartheta)$ are prescribed. *Subject Heading:* **1. Scattering of light.**—*A.A.*

4.8–268 551.593.51

*Hazawa, Masao (*Ocean. Sec. Central Met. Obs. Japan*), **Green flash observed in the Antarctic Ocean.** *Oceanographical Magazine*, Tokyo, 3(4):(139)–(140), Dec. **1951.** table. In English. **MH-BH**—Brief descriptive report on a green flash of the setting sun in the last two or three seconds before its disappearance below the horizon. The phenomenon, which took place on Jan. 4, 1951, was observed and photographed on color film by observers of the Central Meteorological Observatory of Japan who had joined the Japanese whaling fleet on an expedition to the Antarctic. Meteorological data taken at the time of the flash are tabulated. *Subject Headings:* **1. Green flash 2. Observational data 3. Antarctic Ocean.**—*G.T.*

4.8–269 551.593.51

Jacobsen, T. C. (*Dominion Obser. Victoria, B. C.*), **On the spectrum of the green flash at sunset.** *Royal Astronomical Society of Canada, Toronto, Journal*, 46(3):93–102, May/June **1952.** 4 figs., 2 tables, 8 refs. **DLC**—On March 30, 1950, MRS. PATSY SINKEY and MRS. FLORENCE GRONDEL of Seattle took colored moving pictures of the green flash at sunset, from Waikai Beach on the west coast of Oahu Island, Hawaii. These are considered by the author to be the first photographic measurements of the green flash ever made. Five green flash and six low sun diffraction spectra were obtained and the data included in this report. *Subject Headings:* **1. Green flash 2. Waikai Beach, Oahu, Hawaii. I. Sinkey, Patsy V. II. Grondel, Florence A.**—*M.R.*

4.8–270 551.593.51

Michel, H., **Le rayon vert.** [Green flash.] *Ciel et Terre*, 68(9/10):220–222, Sept./Oct. **1952.** fig., 14 refs. **MH-BH**—In reply to a reader's inquiry (brought about by an observed green flash and accompanied by four sketches showing its evolution) the optical processes

roducing the green flash phenomenon are explained. The influence of general or local atnospheric conditions is discussed. A few practical hints are offered for taking color pictures f the flash. *Subject Heading:* **1. Green flash.**—*G.T.*

4.8–271 551.593.7:551.578.1:551.508.762

Jorgensen, Donald L., **Polarization of light from illuminated areas in a ceilometer beam uring rain.** *Journal of Meteorology*, 10(2):160–164, April **1953.** 3 figs., 14 eqs. **MH-BH**—ncorrect indications of cloud height by a recording ceilometer are due to a "rainbow" effect of ain on the beam. The light from illuminated rain is partly polarized by reflection and refracion while light reflected from clouds is not, and true nature of spot can be determined by iewing through a polarizing filter. *Subject Headings:* **1. Ceiling projectors 2. Polarization . Raindrops.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

See also: **Propagation** (Booker), 4.8–4; **Human weather dependence** (Reiter), 4.8–247; **Cloud visibility, radar reflectibility and drop size distribution** (Atlas, Bartnoff), 4.8–264.

4.8–272 551.594.14:551.578.11

Abribat, Marcel; Pinoir, Robert; Pouradier, Jacques and Venet, Anne-Marie, **Sur l'existence de produits radioactifs artificiels dans les eaux de pluie de la région parisienne.** [The resence of artificial radioactive matter in rain water in the region of Paris.] *Académie des ciences, Paris, Comptes Rendus*, 254(11):1161–1163, March 10, **1952.** fig. **DWB**—Measureients made with a Geiger-Müller counter at the research laboratory of Kodak-Pathé are eported. β-rays emitted by dry residue of rainwater were measured and showed abnormally igh activity 8–15 days after nuclear explosions in Nevada on Oct. 22 and Nov. 19, 1951. The ack of emission of α particles proved that the residue investigated was of artificial origin vhich leads to the conclusion that they came from the Nevada explosions, an assumption vhich is supported by the agreement of dates. The radioactivity measured during the critical nonths is graphically illustrated. *Subject Headings:* **1. Radioactivity in rainwater 2. Rainvater analysis 3. Artificial radioactivity 4. Paris, France.**—*G.T.*

4.8–273 551.594.14

Blifford, Irving H., Lockhart, Luther B., Jr. and Rosenstock, Herbert B. (*U. S. Nav. Res. Lab., Wash., D. C.*), **On the natural radioactivity in the air.** *Journal of Geophysical Research*, 57(4):499–509, Dec. **1952.** 2 figs., 11 refs., 16 eqs. **MH-BH**—The concentrations f the various radioactive decay products of radium in the air have been determined by observng the beta activity (1) of pieces of filter paper through which air has been passed, and (2) of hemically separated isotopes obtained from such filter papers. The relative amounts of longved and short-lived products found indicate that, besides the radioactive decay of the subtances, some other process which removes radioactive particles from the air is active. The nean life of the particles with respect to this removing process is found to be about 10 days. The hypothesis that this process is the capture of the radioactive particles by rain droplets clouds) is consistent with measurements made of the radioactive content of rain-water. On he other hand, the removal of the ionized radioactive particles by the electric field of the earth eads to a much smaller effect. *Subject Heading:* **1. Radioactivity in the atmosphere.**—*Authors' Abstract.*

4.8–274 551.594.14

Clementel, E. and Ferrari, F. (*Padova Univ.*), **Sulla componente nucleonica nell'atmosfera II).** [On the nucleonic component in the atmosphere (II).] *Il Nuovo Cimento*, 9(7):572–79, July **1952.** 3 tables, eqs. English summary p. 579. **DWB**—The spectra of proton and neutron components between 400 and 2200 MeV are given for the three atmospheric depths of 033, 680 and 310 g cm^{-2}. The contributions due to radioactive and non-radioative collision processes are discussed separately. As a primary proton spectrum WINKLER's has been used. The results obtained are in good agreement with experimental observation of the behaviour

of the proton component in air and of the latitude effect. For the proton-neutron ratio, distinction has been made between a function giving the ratio of secondaries only of both components, and the real ratio, which takes account of the residual of primary proton spectrum. (For Pt. I. *see: Il N.Cim.* Vol. 8, p. 936, 1951). *Subject Heading:* **1. Radioactivity in the atmosphere.**—*From authors' abstract.*

4.8–275 551.594.14:551.557

Herbst, W. and Philipp, K., **Wanderweg eines atomtechnischen Aerosols.** [Track of an atomic aerosol.] *Naturwissenschaften*, 40(2):54, Jan. 2, **1953.** 3 refs. **DWB**—Measurements with Geiger-Müller counter at Wittental near Freiburg showed a strong increase of "null" effect to 2–3 times its normal level on Oct. 18–20, 1951. This was traced back by weather charts to the radioactive cloud from an atom bomb, which passed Helena, Mont. on Oct. 6. *Subject Headings:* **1. Atomic explosions 2. Radioactivity in the atmosphere 3. Upper air winds.**—*C.E.P.B.*

4.8–276 551.594.14

Hess, Victor F., **Radon, thoron, and their decay products in the atmosphere.** *Journal of Atmospheric and Terrestrial Physics*, 3(3):172–177, April **1953.** 2 tables, 16 refs. **MH-BH**—Ionization due to alpha rays measured at Fordham University, New York, by HESS and VANCOUR (1950) is recalculated to eliminate errors. Radon+decay products gave 53.8×10^{-18} curies/cm³ or 0.70 I (ions produced per cc per sec), thorium products 41.0×10^{-18} curies or 0.53 I. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Fordham University, New York.**—*C.E.P.B.*

4.8–277 551.594.22:312.26

Metropolitan Life Insurance Co., **Lightning deaths most frequent in summer.** *Metropolitan Life Insurance Co., Statistical Bulletin*, 33(6):8–10, June **1952.** fig. **DLC**—Statistical figures on lightning fatalities in the U. S. A chart on the regional distribution of lightning death frequency is presented and discussed. Situations in which fatalities most frequently occur are described. This brief survey is based on information compiled by the Statistical Bureau of the Metropolitan Life Insurance Co. from U. S. Weather Bureau material and other sources. Its major objective is to demonstrate that death from lightning can often be prevented. *Subject Headings:* **1. Lightning frequencies 2. Lightning fatalities.**—*G.T.*

4.8–278 551.594.22:621.316.9:551.508.94

†Norinder, Harald (*Uppsala Univ.*), **Experimental lightning research.** *Franklin Institute, Journal*, 253(5):471–504, May **1952.** 23 figs., 51 refs. **DWB**—A comprehensive survey, from a nonmeteorological point of view, accompanied by numerous photographs, reproductions of records, and line drawings covering Franklin's experiments and their effect on European scientists and on research during the next century; present optical methods of research; Swedish research into electric field variations due to lightning; use of the high-speed recording cathode-ray oscillograph to record lightning surges; research in the U.S.A. (G.E. & Westinghouse Co.); use of artificial lightning to study surges and other effects. Other methods of measuring lightning currents with application to problems of power line protection. *Subject Headings:* **1. Lightning research 2. Cathode-ray oscillographs 3. Power lines 4. Lightning protection.**—*M.R.*

4.8–279 551.594.221:629.13

Chowns, R. H., **The incidence and effects of lightning discharge on civil aircraft during the years 1948 to 1951.** *British European Airways Corp., R.S.D. Report*, No. 33, Dec. **1952.** 23 p. 8 figs., 11 refs. Mimeographed. **GB-MO**—Numerous tables and analyses are given of frequency of lightning flashes in flight on BOAC and BEA aircraft of various types. BEA strikes were once in 2350 flying hours, BOAC once in 3720. Strikes were more frequent on Vikings than Dakotas. Tables give associated cloud type, precipitation, turbulence, and details of damage. Frequency greatest in spring and early winter, at temperatures around 0°C and −12°C, between 5000 and 9000 ft. Maps of locations are given. *Subject Headings:* **1. Lightning 2. Aircraft damage.**—*C.E.P.B.*

4.8–280 551.594.221

Sen Gupta, Prabhat K. (*Met. Office, New Delhi*), **Superior mirage of lightning streaks.** *Indian Journal of Meteorology and Geophysics*, 3(2):161–162, April **1952.** 3 figs., 4 refs. **MH-BH**—Characteristic features of this rare phenomenon are summarized on the basis of occasional reports. *Subject Headings:* **1. Lightning 2. Superior mirages.**—*A.A.*

4.8–281 551.594.51:551.521.64:550.38

Landseer-Jones, B. C., **The streaming of charged particles through a magnetic field as a theory of the aurora.** *Journal of Atmospheric and Terrestrial Physics*, 3(1):41–57, Jan. **1953.** refs., 30 eqs. **DWB**—The motion of a narrow stream of equal + and − particles, itself neutral, emanating from the sun and flowing into an increasing magnetic field, is discussed. With certain limitations it can be applied to the duration and height of auroras, but explanation of the auroral zones is difficult. *Subject Headings:* **1. Auroral theory 2. Corpuscular radiation . Terrestrial magnetism.**—*C.E.P.B.*

STATISTICAL METHODS

4.8–282 518

Stiefel, Eduard, **Über einige Methoden der Relaxationsrechnung.** [On some methods of relaxation calculation.] *Zeitschrift für angewandte Mathematik und Physik*, 3(1):1–33, Jan. **1952.** 10 figs., 85 eqs. English summary p. 33. **DLC**—A description of the iterative solution of linear equations represented by bounded lattices, and some suggestions for improved technique. [The relaxation method has applications in meteorology, see e.g. *item* 2.11–68 Nov. 1951, *MAB.*] *Subject Heading:* **1. Mathematical techniques.**—*C.E.P.B.*

4.8–283 518.12:016

Mathematical Tables and Other Aids to Computation. A Quarterly Journal edited by C. W. Cannon, C. C. Craig, A. Erdélyi, F. J. Murray, J. Todd, D. H. Lehmer, chairman. Pub. by the National Research Council, Wash., D. C., Div. of Mathematics. v. 1, No. 1, **1943–.** quarterly. Price: $5.00 per year. **DWB, DLC**—A valuable periodical for the computing meteorologist. Detailed critical abstracts are given on recently published mathematical tables, automatic computing machinery and other aids to computation (punched card methods, harmonic analysis, etc.). Interesting features of the periodical are historical notes, errata in published tables, bibliography of unpublished tables, brief papers and literature reviews (note for example, the excellent review on Bessel functions in 1(17):205–308, April 1944). The periodical covers also papers in the fields of mathematical statistics, astronomy, physics, general geophysics, meteorology, navigation, etc. *Subject Headings:* **1. Bibliographies . Mathematical tables 3. Bessel functions. I. National Research Council, Wash., D. C. I. Lehmer, D. H.** (*ed.*).—*A.A.*

4.8–284 519.24

Gebelin, H. and Ruhenstroth-Bauer, G., **Über den statistischen Vergleich einer Normalkurve und einer Prüfkurve.** [On the statistical comparison of a normal curve and a test curve.] *Naturwissenschaften*, 39(20):457–461, Oct., **1952.** 2 figs., 5 tables, 3 refs. **DWB**—Describes 5 different methods of comparing statistically either individual points or the whole course of a normal curve with an experimental series, with helpful tables. *Subject Heading:* **. Statistical techniques.**—*C.E.P.B.*

4.8–285 519.241.1

Alekseev, G. A., **Integral'nyĭ method vyiavleniia statisticheskikh zakonomernosteĭ nezhdy sluchaĭnymi velichinami.** [Integral method for exposing statistical regularities between random values.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy*, No. 14(68):46–94, **1949.** 6 figs., 5 refs., 88 eqs. **DLC**—Instead of investigating the relationship between two magnitudes y and x author proposes to investigate the relationship between their integral distribution functions. A very detailed theoretical treatment is given. The

integral correlation coefficient is:

$$r_{xy} = \frac{p(x,y) - p(x) \cdot p(y)}{\sqrt{p(x) \cdot [1 - p(x)] \cdot p(y) [1 - p(y)]}}$$

$p(x)$ is the probability for all $x^1 \geqq x$

$p(x,y)$ is the probability for $\begin{cases} x^1 \geqq x \\ y^1 \geqq y \end{cases}$

This is a single case of the correlation coefficient between two occurrences, well known in mathematical statistics. Suggestions are given determining formulas for the distribution surface. The theory is also examined for random magnitudes. A practical application of the author's method is given in another paper. *Subject Headings:* **1. Statistical techniques 2. Correlation coefficients.**—*A.A.*

4.8–286 519.241.1

Lucke, O. and Haake, G. R., **Über Korrelationsmasse.** [Correlation measure.] *Zeitschrift für Meteorologie*, 6(12):355–369, Dec. **1952.** 3 figs., 7 tables, 15 refs., eqs. **MH-BH**—Karl Pearson's correlation measure for expressing numerically the "curvature of a scattered diagram" of two dimensional statistical quantities yields greater absolute values than the correlation coefficient. This discrepancy is due to the fact that the regression lines of the distributions show irregularities which disappear as the number of observations increases. The correlation ratios and the maximal correlation measure of H. Gebelein give the illusion of an excessively large stochastic relationship. It proposed to replace the regression lines, the transformation functions, the distribution $h_1(x_1)$, $h_2(y_1)$ respectively by their trends. Formulas for the goodness of fit of the trends are given. Correlation coefficients are calculated directly from the first to fourth moments and the first to ninth moments respectively. *Subject Heading:* **1. Correlation coefficients.**—*Trans. of authors' abstract.*

4.8–287 519.241.2

Lüllmann, H. and Förster, W., **Über die Möglichkeit des Vorkommens doppelgipfliger Häufigkeitsverteilungen bei homogenem Material.** [On the possibility of occurrence of double-peak frequency distributions in homogeneous material.] *Experientia*, Basel, 9(3):110–111, March 15, **1953.** 2 figs. English summary p. 111. **DWB**—Describes some experiments with pharmacological measurements which suggest that an M-shaped distribution in discrete ("all or nothing") values does not necessarily imply that the material is inhomogeneous. *Subject Heading:* **1. Statistical studies.**—*C.E.P.B.*

4.8–288 519.272

Yaegashi, S., **On the error of approximate computation of correlogram.** *Society for the Long-Range Forecast of Tohoku District, Journal*, 11(2):17–19, Nov. **1951.** 3 refs. In Japanese, English summary p. 249–250 (reprinted and laid in). **DWB**—The author investigates three different formulas for the approximate computation of the serial correlation coefficient r in certain time series, and finds that the error in two of them ($r^1{}_k$ and $r^{11}{}_k$) is negligible while the third ($r^*{}_k$) does not warrant sufficient accuracy unless the number of time series is very large. *Subject Headings:* **1. Correlation coefficients 2. Sampling errors.**—*G.T.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON RADIATION BIOCLIMATOLOGY

By: *Isadore L. Dordick*

INTRODUCTORY NOTE

In this bibliography the principal emphasis is placed upon the literature dealing with the biological action of radiations which are normally present in the atmosphere and the effects of which are primarily chemical rather than changes in the thermal balance of the organism. The radiations included are the ultraviolet, the infrared, the visible spectrum and cosmic rays. Particular attention is given to the papers concerned with the specific physiological effects produced in normal human beings by the direct impingement of these radiations upon them.

This bibliography is not aimed at being exhaustive but limits itself to presenting a selection of the more important papers published during the period 1928–1953. For a review of the literature prior to this period and for a more complete listing of the literature in general the reader is referred to the following items in this bibliography: 4H–1, 4H–12, 4H–19, 4H–35, 4H–42, 4H–55, 4H–60, 4H–86, 4H–95, 4H–96, 4H–97 and 4H–147.

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BIBLIOGRAPHY ON RADIATION BIOCLIMATOLOGY

1928

4H–1 551.521.1:551.521.63:551.586:612

†Laurens, Henry, **The physiological effect of radiation.** *Physiological Reviews*, 8(1):1–91, Jan. 1928. **DLC**—A comprehensive review of the scientific literature (up to and including 1926) dealing with the physiological action of radiant energy, in particular UV and visible radiation upon the skin, eyes, circulatory system, blood (in vivo) and metabolism, and of the various explanations of their modes of action. A very extensive bibliography is appended. *Subject Headings:* **1. Radiation effects 2. Skin 3. Eyes 4. Circulatory system 5. Blood 6. Metabolism.**

1929

4H–2 551.521.63 551.586:613.15:616.2

Maughan, George H. and Smitty, D. J., **Irradiation from a quartz-mercury-vapor lamp as a factor in the control of common colds.** *American Journal of Hygiene, Ser. A*, Baltimore, 9(2): 466–472, March **1929.** 3 tables, 6 refs. **DLC**—Of 81 cold susceptible males, 23 received a 10 to 16 min (5 8 min front and 5–8 min back) irradiation over a week from a quartz mercury vapor lamp the during period Nov. 1927–March 1928. During the first period of 12 weeks from Nov. to Jan. the average number of colds from the irradiated group was 1.56 and for the controls 2.80. In the second period Nov. to March there was an average of 1.24 colds in the treated group and 2.79 in the control group. *Subject Heading:* **1. Quartz mercury vapor lamp radiation.**

1930

4H–3 551.521.11:551.586:612

Haxthausen, H., **Changes in skin vessels and their significance in various skin diseases.** *British Journal of Dermatology*, London, 42(3):105–125. **1930.** 3 figs., 20 refs. **DSG**—The protracted action of sunlight on the skin causes vascular changes marked by dilatation of the capillaries and venules; the arteries seem to be more easily detectable than normally. The change is persistent and irreversible in the visible vessels. The "pure forms" of light effects are found chiefly in the upper part of the chest in women who keep this region covered in winter and uncovered in summer. The light affected areas are marked by the development of lupus erythematosus, erythema multiforma, eczematized pityriasis simplex, etc. *Subject Headings:* **1. Solar radiation effects 2. Vascular effects 3. Skin diseases.**

4H–4 551.521.63 551.586:612

Luckiesch, M., Holladay, L. L. and Taylor, A. H., **Reaction of untanned human skin to ultraviolet radiation.** *Optical Society of America, Journal*, 20(6):423–432, **1930.** 3 figs., 6 tables. **DLC**—The spectral reflectance of the skin and the relative effectiveness per unit energy of various wave lengths in producing erythema were studied on three subjects, a blond, brunette and an intermediate type. The reflectance of the skin for radiations of great therapeutic value (shorter than 3100 Å) is very low and the shape of the curve of spectral reflectance indicates a specific absorption of UV radiation of greatest therapeutic value. The erythemal effectiveness of radiation in terms of a unit effect of 2967 Å was determined. The relative erythemal sensitivities of the skin of the three subjects are in the ratios 100, 86 and 119. *Subject Headings:* **1. UV radiation 2. Erythema formation 3. Skin albedo 4. Skin sensitivity.**

1931

4H–5 551.521.63 551.586:612

Anderson, William T. and Fraser, Hugh D., **The penetration of ultraviolet rays into live animal tissue.** *British Journal of Physical Therapy*, 6(8):170, Nov. **1931.** 2 tables, 7 refs. **DSG**—"The epidermis of the young child varies between 0.15 and 0.25 mm in thickness. Through this UV may be transmitted in the following extent:

2567 Å U	trace to	0.5%
2967 Å U	1% to	5%
3130 Å U	5% to	10%

The epidermis of adults is considerably thicker than that of young children, averaging about 1 mm. The amount of incident UV which can normally penetrate through this layer is, for all wave lengths of the ultraviolet, less than 0.1%." *Subject Heading:* **1. UV radiation penetration.**

4H–6 551.521.63 551.586:612

Bachem, A. and Reed, C. I., **The penetration of light through human skin.** *American Journal of Physiology*, Boston, 97(1):86–91, **1931.** 6 refs., 4 figs. **DLC**—The principle underlying the method of measuring the transmission of rays through tissues consists of filtering the rays of a Kronmayer lamp, an incandescent bulb or an infrared radiator through a combination of filters that limit the range to a narrow band. Transmission was measured by exposing a photographic plate on a holder with a screen having an opening 1.5 mm in diameter, placed at right angles to the beam and mounting the skin specimen on a composition tube which was then placed in the opening of the screen so that it rested on the photographic plate. Measurements indicated that visible and near infrared rays were strongly absorbed by the blood of the corium and subcutaneous layers. The heating effect must be small because of the small absorption of the epidermis and the strong convection by the blood streams: the far infrared has very little penetrating power, being largely absorbed in the epidermis. Percentage penetration of UV varies more than in other parts of the spectrum. At 280 mμ the absorption in the corneum and prickle-cell layers is very marked. Near 300 and 250 mμ penetration is greater, more radiation reaching the stratum Malpighii and the corium. It is surmised that erythema formation occurs in the general layer (or the corium) under the shadow of the upper layers. From 250 mμ down the absorption of the horny layer increases rapidly. Near 200 mμ absorption is complete with no radiation reaching the living layer of the skin. *Subject Headings:* **1. Skin 2. Light penetration 3. Erythema formation 4. Near infrared penetration 5. UV radiation penetration 6. Far infrared tissue penetration.**

4H–7 551.521.63:551.586:613.15:616.2

Doull, James A., Hardy, Mary, Clark, Janet M. and Herman, Nathan B., **The effect of irradiation with ultraviolet light on the frequency of attacks of upper respiratory disease (common colds).** *American Journal of Hygiene*, Baltimore, 13(2):460–477, March **1931.** 2 figs., 11 tables, 3 refs. **DLC**—One hundred and seventy-nine individuals were irradiated with UV radiation from mercury-vapor lamps for a period of 31 weeks. The dosages varied from light to moderate. The standard aimed at being the level of the minimal erythema dose. The total incidence of common colds "was slightly higher for the irradiated (receiving more than 10 treatments) than for the controls." In addition more severe cases than those marked by the occurrence of fever, by cough or by long duration were just as frequent in the irradiated as in the control group. *Subject Headings:* **1. Common cold 2. Quartz mercury vapor lamp radiation.**

4H–8 551.521.63:612 551.521.9:612 551.521.1:612

Pearson, A. R. and Gair, C. J. C., **Penetration of radiation into animal tissues.** *British Journal of Physical Medicine*, London, 6(2):27–30, **1931.** 2 figs., 6 tables. **DSG**—Studies carried out on the human skin indicate that the spectrum from wave length 245 mμ to the limit of the visible red can be divided in accordance with its penetrative power into three regions: 1) "the UV region from 245 to about 380 mμ, which is very largely absorbed by the stratum corneum"; 2) "a region extending about wave length 580 mμ in the yellow, which, apart from reflection, is mainly absorbed in the cutis"; 3) "the long wave visible region from the neighborhood of 580 mμ onwards, of which as a general rule about one half is reflected and of the remainder about equal parts are absorbed by the cutis vera and transmitted to deeper tissues." *Subject Headings:* **1. Long UV radiation 2. Short UV radiation 3. Radiation penetration 4. Visible radiation 5. Infrared radiation.**

4H–9 551.521.63:612

Waller, Mary D., **The measurement of actinic erythema produced by ultra-violet radiation with special reference to the latent time.** *Royal Society of London, Proceedings, Ser. B*, 108:258–263, **1931.** 6 figs., table, 7 refs. **DLC**—Erythemas were produced on the skin of a single subject by irradiation from a mercury quartz vapor lamp and their intensities were measured by determining

the relation between latent time and length of exposure. This relationship is a curve which terminates at a least exposure corresponding to a longest latent time. It is concluded that the latent time of erythema provides the most accurate and simple way of estimating the effect of UV radiation on the skin. *Subject Headings:* **1. UV radiation effects 2. Erythema formation 3. Erythema latency period.**

4H–10 551.521.63:612

Waller, Mary D., **The relation between energy, doses of ultra-violet radiation and actinic erythema produced.** *Royal Society of London, Proceedings, Ser. B,* 108:264–270, **1931.** 2 figs., 2 tables, 7 refs. **DLC**—An investigation of the effect of radiation from a mercury vapor lamp on the skin as measured by the resulting erythema and the "dose" (intensity×time) received showed that the effect of a given "dose" of the weak intensity is as great as that of the most powerful intensity used. "It is concluded that the production of erythema follows the Bunsen-Roscoe law for a photochemical action, i.e., the time factor is unity." *Subject Headings:* **1. UV radiation 2. Erythema formation 3. Erythema dose 4. Erythema latency period 5. Bunsen-Roscoe law.**

1932

4H–11 561.508.25:551.521.63:612

Coblentz, W. W., Stair, R. and Hogue, J. M., **The spectral erythemic reaction of the untanned human skin to ultraviolet radiation.** *U. S. National Bureau of Standards, Journal of Research,* 8(4):541–547, April **1932.** fig., table, 9 refs. **DLC**—"The spectral erythemic reaction of those persons exposed to equal amounts of homogeneous UV radiation of various wave lengths is described. The source of radiation was a standard vertical quartz mercury vapor lamp which has a series of intense conveniently spaced emission lines extending from 248 to 365 mμ. These emission lines were separated by passage through the spectrometer exit slit, the jaws of which were dusted with anthracene, which by fluorescence indicated the accuracy of the isolation of the line under investigation. The erythemal reaction and the radiometric measurements were made on the spectral line directly back of the exit slit. In the region of 250 mμ the spectral erythemic reaction was supplemented by exposures to the heterogeneous radiation from a mercury vapor lamp having a high selective emission in the resonance line at 253.7 mμ. Data are given on the reciprocity of intensity and time of exposure, and also on the relative spectral erythemic reaction in the range of wave lengths extending from 245 to 311 mμ." *Subject Headings:* **1. UV radiation 2. Erythema formation 3. Erythema dose.**

4H–12 551.521.11:551.586:612

Ellinger, Friedrich, **Die Lichtempfindlichkeit der menschlichen Haut, ihre Bestimmung und Bedeutung für die lichtbiologische Konstitutionsforschung.** [Light sensitivity of the human skin, its determining factors and its importance for photobiological constitution studies.] *Strahlentherapie,* Berlin, 44:1–82, **1932.** 23 figs., 14 tables, 69 refs. **DSG**—This comprehensive review covers: historical development of knowledge on the physical bases of light erythema, biological processes involved in this phenomenon, methodology of the study of light erythema, light sensitivity in healthy individuals and pathological aspects of light erythema. *Subject Headings:* **1. Erythema light sensitivity 2. Light pathology.**

4H–13 551.508.25:612 551.586:612

Saidman, Jean, **Classement des procédés de mesure préconisés en thérapeutique.** [Classification of procedures of measurements recommended in therapeutics.] *Institut d'Actinologie, Paris, Annales,* 7(1/2):17–26, July/Aug. **1932.** 3 figs. **DSG**—A review of the various methods for measuring UV radiation and neighboring short wave radiation. These include: 1) actino-thermic -the bolometer of Langley, the method of Coblentz using filters and thermocouples, 2) actino-chemical—photometers with progressive absorption, photometers with filters, colorimetric methods, decomposition of acetone, darkening of nitrate of paraphyneline dromine, darkening of lithopane, etc. and photoelectric method. *Subject Heading:* **1. UV radiation measurement.**

4H–14 551.521.63:612 551.521.9:612 551.521.61:612 551.586:612

Walthard, Karl M. and Spörri, Hans, **Über die Beeinflussung der sensiblen Chronaxie durch Lichtstrahlen verschiedener Wellenlängen.** [Effect of light rays of different wave lengths upon sensible chronaxie.] *Zeitschrift für die Gesamte Physikalische Therapie,* 42(8):212–226, **1932.** 6 figs., refs. **DSG**—Investigations of sensible nerves and current impulse sensitivity during irradiation with red, blue and UV reveal the same changes in chronaxie, characterized by an initial drop and a subsequent rise of the sensible chronaxie as expression of a primary rise and secondary fall of the excitability of the cutaneous sensitivity. Differences occurred only in the temporal relationships in the appearance and disappearance of these changes in chronaxie. Red light has the most rapid and briefest effect; UV is slowest and most enduring. Blue light is an intermediate position with regard

o its effect upon cutaneous sensitivity and chronaxie. *Subject Headings:* **1. Nerve impulse 2. Chro-axie 3. Blue light 4. Red light 5. UV radiation 6. Skin sensitivity.**

1933

4H–15 551.521.63:612 551.586:612

Becker, J. and Gaertner, O., **Untersuchungen zur Aufklärung der Empfindlichkeitsdifferenzen er Haut von Neugeborenen und Erwachsenen gegenüber Ultraviolettstrahlung.** [Studies on the UV sensitivity of the skin in infants and adults.] *Strahlentherapie*, Berlin, 48:251–266, **1933.** 6 figs., 8 refs. **DSG**—Surface parallel skin sections of definite thickness, kept moist during measurement, were used to determine their penetrability to spectrally analyzed light in the wave length 312–296 mμ. In newly born infants skin layers 0.1 mm thick are less penetrable than similar skin thickness of adults. *Subject Headings:* **1. Short UV radiation 2. Radiation penetration.**

4H–16 551.521.61:612 551.586:612

Dufton, A. F. and Bedford, T., **Nose opening rays.** *Journal of Hygiene*, Cambridge, 33(4):476–84, Nov. **1933.** 9 figs., 17 refs. **DSG**—The authors tested the hypothesis of Sir Leonard Hill, that there are 2 physiologically distinct types of infrared radiations, namely "nose closing" and "nose opening" rays and that the former are produced by bright incandescent sources of heat and the latter by dark sources. In well controlled experiments with 75 subjects exposed to bright and dull fires no evidence was found of "nose opening" rays. Nose closing occurred not only with a bright electric fire but also with a dull electric fire. Nose closing was produced also by heating the subject by convection and conduction. Exposure to the sun also leads to nose closing. It is concluded that nose closing is probably caused by any rapid warming of the skin and is not dependent upon any specific quality of radiation. *Subject Headings:* **1. Infrared radiation 2. Nose closing rays 3. "Nose opening" rays.**

4H–17 551.521.63:551.586:612

Frankenberger, W., **Photochemische Betrachtungen zur Wirkung ultravioletter Strahlung auf die menschliche Haut.** [Photochemical considerations on the action of ultra-violet radiation upon human skin.] *Naturwissenschaften*, 21(5/7):116–124, Feb. 14, **1933.** 5 figs., 23 refs., eq. **DLC**—A report on several spectroscopic and photochemical investigations of the properties of tyrosin and histidin, which are involved in the production of erythema and pigmentation during UV irradiation of skin. Spectroscopic data show that the skin sensitivity curve is analogous to the curve for the "effective" absorption of short wave radiation by tyrosine salts in the deep epidermis layers and by histidine distributed throughout the epidermis. The photochemical sensitivity and reactions of these proteins are investigated in vitro. It is concluded that tyrosine is the source of UV-pigment and histidine is that of the irritants producing erythema. *Subject Headings:* **1. UV radiation effects 2. Erythema formation 3. Pigmentation 4. Skin sensitivity curve.**

4H–18 551.521.63:551.586:612

Guthmann, Heinrich and Nagel, Werner, **Ultravioletttlichtempfindlichkeit und menstrueller Zyklus.** [UV sensitivity and menstrual cycle.] *Strahlentherapie*, Berlin, 48:267–282, **1933.** 8 figs., 9 tables. **DSG**—The influence of the menstrual cycle upon the intensity of the erythema produced by UV radiation was investigated. In 21 instances (51.2%) intensity of light erythema increased during 7 days before menstruation or on the first day of menstruation. Both in the average curves and in 33 individual cases (80.5%) sensitivity declined below the intermenstrual value in the course of the menstrual period. Ionic and endocrine changes occurring during menstruation influence light sensitivity. *Subject Headings:* **1. UV radiation effects 2. Endocrine effects 3. Menstrual cycle 4. Erythema.**

4H–19 551.521.11:612 551.521.63:612 551.521.9:612 551.586:612

Laurens, Henry, **The physiological effects of radiant energy.** New York, Chemical Catalog Company, **1933.** 610 p. *American Chemical Society, Monograph Series.* **DLC**—A detailed review of the literature on the physiological action of radiant energy, in particular UV radiation upon man and domestic animals. The aspects covered are: the physics of radiant energy; the effects on skin wounds and on some skin diseases; effects on the eye, on the circulatory system, on the blood, on metabolism, on body temperature and respiration; photodynamic and optical effects; effect on tuberculosis; effects on bacteria and other organisms, on toxins, proteins, ferments and the mode of action of radiant energy on physiological and pathological processes. *Subject Headings:* **1. Radiation 2. Photobiological effects 3. Photodynamic action 4. Pathological effects.**

4H–20 551.521.11:551.586:616

Roffo, A. H., **Heliotropism of cholesterol in relation to skin cancer.** *American Journal of Cancer*, N. Y., 17(1):42–51, June **1933.** 12 figs., 10 tables, 13 refs. **DSG**—Data are presented on

the amount of cholesterol in human cancer; in tissues from precancerous and cancerous lesions, on the promotion of cancer by diets rich in liquids, on the cholesterol content of skin cancer. A relationship is established between skin cancer and cholesterol and it is suggested that exposure to sunlight increases cholesterol content and induces skin cancer. Experimental data on rats substantiating this hypothesis are presented. *Subject Headings:* **1. Carcinogenesis 2. Solar radiation effects.**

1934

4H–21 551.521.63:612 551.586:612 551.508.25:612

Coblentz, W. W. and Stair, R., **Data on spectral erythemic reaction of untanned human skin to ultraviolet radiation.** *U. S. National Bureau of Standards, Journal of Research*, 12(1):13–14, Jan. **1934.** table, 4 refs. **DLC**—The writers extended the curve of spectral erythemic reaction to wave lengths longer than 3150 Å. The data previously published have been revised and are given in table. The new data in the spectral range 3150 to 3300 Å have little effect upon the evaluation of the erythemogenic efficiency of therapeutic lamps. *Subject Headings:* **1. Spectral erythema curve 2. Erythema formation 3. Long UV radiation.**

4H–22 551.521.63:612 551.521.11:612 551.586:612

Ellinger, Friedrich, **Lichtbiologische Konstitutionsstudien am Weibe, unter Berücksichtigung der Verhältnisse in der Schwangerschaft.** [Photobiological constitution studies on women, with reference to conditions during pregnancy.] *Archiv für Gynäkologie*, Berlin, 156:471–496, **1934.** 5 figs., 13 tables, 35 refs. **DSG**—Age, color of hair and sex as well as season are four factors which regularly influence the light sensitivity of the skin. In addition, menstruation is a special factor influencing the light sensitivity of the skin. Light sensitivity increases during pregnancy: it increases rapidly beginning with the third month and reaches a maximum in the seventh month. A parallel relationship was found between light sensitivity and the number of open capillaries per sq mm. The relationship between light sensitizers (porphyrin) and light sensitivity, skin reaction to UV radiation and digestive juice secretion are discussed. *Subject Headings:* **1. Photosensitivity 2. Endocrine effects.**

4H–23 551.581 551.508.25:551.521.3

Hoelper, O., **Strahlenklimatische Fragen im Ultraviolett.** [Radiation climatic problems in the UV.] *Der Balneologe*, Berlin, 1(6):284–289, June 15, **1934.** table. **DSG**—A general article primarily concerned with the methodological aspects of UV radiation measurement. The author discusses the difficulties involved in the physical measurement of UV radiation and determining effectiveness of various wave lengths, the diurnal and seasonal variation in wave lengths received at the earth's surface, the determination of the properties of sky and direct solar radiation and atmospheric factors influencing the radiation climate. *Subject Headings:* **1. UV radiation measurement 2. Seasonal UV radiation variations 3. Radiation bioclimate.**

4H–24 551.521.11:551.586:612

Jores, Arthur, **Über den Einfluss des Lichtes auf die 24-Stundenperioden des Menschen.** [Effect of light upon the 24-hour rhythm of man.] *Deutsches Archiv für Klinische Medizin*, Leipzig, 176(5):544–549, **1934.** 2 figs., table, 12 refs. **DSG**—In 4 rabbits the eyes were closed, over a period of 3 days, by means of wound clamps and the temperature and blood sugar were measured every 24 hours. The cyclical variations of temperature and blood sugar were abolished. Investigations in 4 blind individuals showed that a 24-hour stay in the dark resulted in the abolition of temperature rhythm in 2 and a disturbance of the rhythm in the other 2 individuals. In all 4 the nocturnal urine excretion became similar to the diurnal excretion. The specific weights of night and day urine were alike. *Subject Headings:* **1. Physiological rhythm 2. Blood sugar 3. Body temperature 4. Radiation effects.**

4H–25 551.521.63:551.586:612

Kittel, Theodor and Stahl, Rudolf, **Beeinflussung der Höhensonnenerythem- und Pigmentbildung durch diätetische Massnahmen und durch Applikation verschiedenartiger Salben.** [Influencing ultraviolet erythema and pigment formation by dietetic measures and by various salves.] *Strahlentherapie*, Berlin, 48:283–295, **1934.** 6 figs., 6 tables, 19 refs. **DSG**—Acid diet in comparison to alkaline and neutral diet intensifies erythema and pigmentation. Alkaline diet in comparison to normal and acid diet weakens erythema and pigmentation. After an alkaline period the intensifying action of an acid diet fails to manifest itself distinctly even if a normal diet has been intercollated. The weakening action of alkaline diet is not manifested after an acid period. *Subject Headings:* **1. Erythema formation 2. Pigmentation 3. Solar radiation effects. 4. Dietetic effects.**

4H–26 551.521.63:551.586:612

Lehmann, Gunther, **Einfluss der Ultraviolettbestrahlung auf den Arbeitsstoffwechsel und die Arbeitsfähigkeit des Menschen.** [Influence of UV radiation upon the working metabolism and working capacity of man.] *Strahlentherapie*, Berlin, 48:364–372, **1934.** 7 figs. **DSG**—A systematic irradiation of healthy individuals with UV radiation produced a decline in the basal metabolism and a rise in the respiratory quotient, accordingly an increase in carbohydrate oxidation combined with a rise in the carbohydrate storage and a subjective need for carbohydrates. There was also an improvement in the oxygen utilization of the inspired oxygen and a rise in the alveolar CO_2 tension. Working metabolism was marked by an improvement in efficiency and recovery capacity, an increase in work capacity and a diminution of tiredness. There was also a rise in the alkali reserve, a diminution of heart and respiratory frequency, a fall in blood pressure, and an increase in sweating during irradiation. *Subject Headings:* **1. UV radiation effects 2. Basal metabolism 3. Circulatory system 4. Blood pressure 5. Working capacity 6. Respiration rate 7. Oxygen consumption.**

4H–27 551.521.11:551.586:612:616 546.214:616

Maisin, J. and de Jonghe, A., **Au sujet de l'action de la lumière et de l'ozone sur certains corps cancerigènes.** [The action of light and of ozone upon certain carcinogenic substances.] *Société de Biologie, Paris, Comptes Rendus des Séances*, 117:111–115, **1934.** 2 tables. **DSG**—Mice injected with 1–2 benzpyrene and exposed to intense sunlight which was filtered through ordinary window glass developed cancer more quickly and more frequently than mice injected with same compound but exposed to moderate sunlight or kept in darkness. Benzpyrene was inactivated by ozone and its carcinogenic property was reduced. *Subject Heading:* **1. Carcinogenesis.**

4H–28 551.521.11:551.586:612 551.521.63:612

Pincussen, Ludwig, **Licht und Stoffwechsel.** [Light and metabolism.] *Strahlentherapie*, Berlin, 48:308–315, **1934. DSG**—General review of the effect of light and of UV light upon various biochemical reactions involved in metabolism. *Subject Headings:* **1. Metabolism 2. Visible radiation 3. UV radiation.**

4H–29 551.521.11:551.586:612 612.014.43

Winslaw, C.-E. A., Greenberg, Leonard and Herrington, L. P., **The influence of heat and light upon nasal obstruction.** *American Journal of Hygiene, Ser. A*, 20(1):195–217, July **1934.** 10 figs., 7 tables, 3 refs. **DLC**—A tambour and a spirometer method for measuring changes in the diameter of the airways are described and applied to determine the effect of thermal and radiational conditions of the environment upon the nasal passages. Constriction of the nasal airways results from: 1) exposure of the skin to the rays of a dark-glow radiant heater, 2) immersion of the arm in hot water and 3) exposure to a high atmospheric temperature. No evidence is found that these responses are the result of qualitative effects of specific electromagnetic wave lengths and that either cold water or cold air have a "nose-opening" effect. The addition of the influence of light rays of shorter wave length to the longer rays of the dark-glow heater increased congestion. No evidence is adduced to indicate the existence of any real antagonistic influence or any specific effect upon nasal congestion by rays of particular wave lengths. Nasal congestion can be explained as the result of purely thermal effects. *Subject Headings:* **1. Infrared radiation 2. Nose closing rays.**

1935

4H–30 551.521.11:612

Blum, Harold F., **Photosensitization of living systems.** *Cold Spring Harbor Symposia on Quantitative Biology*, 3:318–329, **1935.** fig., 28 refs. **DLC**—A discussion of the mechanism of photodynamic action which is essentially the production of changes in biological systems by the action of light upon a photosensitizing substance which has been added to the system. The hypothesis is proposed that the oxidation of cell constituents and the production of toxic bleach substances of the sensitizer are factors in the total photodynamic effect. *Subject Headings:* **1. Photosensitization 2. Photodynamic action.**

4H–31 551.521.63:551.586:612 612.014.43 551.586:612

Clark, Janet Howell, **The effect of ultraviolet radiation on lens protein in the presence of salts and the relation of radiation to industrial and senile cataract.** *American Journal of Physiology*, 113(3):538–547, **1935.** figs., 6 refs. **DLC**—Lens protein extracted in sodium, potassium and calcium chloride solutions was exposed to UV radiation from a Hanovia mercury arc at pH 5, 4 to 7, 8. The development of opacity was determined by means of a Tyndallometer. Moderate heat alone, 50°C, does not produce opalescence in any of the extracts. Intense UV radiation alone produces no increase in opacity in extracts of lens radiated at 4°C and pH 7.2 except in the extracts containing $CaCl_2$. Opacity became very marked if irradiated extracts containing calcium were treated for 2 hrs at 50°C. It is suggested "that the higher incidence of cataract in workers exposed to molten glass and

metals is due to an increased rate of precipitation of light denatured protein when the lens is heated above body temperature by exposure to large sources of radiant energy, and when low concentration of calcium or other substances producing a similar effect are present." *Subject Headings:* **1. UV radiation effects 2. Eyes 3. Lens cataract.**

4H–32 551.521.63:612 551.521.11:612

Crew, William H., **Perspiration and erythema.** *Nature*, London, 136(3435):340, Aug. 31, **1935. DLC**—Spectroscopic analysis indicates that a film of human sweat 1 mm thick absorbs slightly in the region of 3300 Å, very appreciably at 2900 Å and is almost opaque at 2700 Å, so that human sweat acts as a partial protection against sunburn which is induced chiefly by light of wave-lengths 2900 Å and 3100 Å. Personal experience supporting the supposition that sunlight absorbs erythema producing rays, especially the more ready occurrence of sunburn on a windy day, is cited. Urea, uric acids and certain amine acids are considered to be the elements absorbing sunlight. *Subject Headings:* **1. Short UV radiation 2. Erythema formation 3. Sweating.**

4H–33 550.385:612 551.521.9:612

Düll, T. and Düll, Bernhard, **Neue Untersuchungen über die Beziehungen zwischen der Zahl der täglichen Todesfälle und dem magnetischen Störungscharakter.** [New investigations on the relationship between daily death rate and magnetic disturbances.] *Zeitschrift für Meteorologie, Bioklimatische Beiblätter*, 2:24–31, **1935.** 5 figs., table, 6 refs. **DWB** Weather sensitivity manifested through an increased death rate and the appearance and aggravation of mental, nervous and circulatory diseases is attributed to short wave radiations associated with irregular and short period changes in the electromagnetic field of the earth, produced by intensified eruptive activity in the sun. Seventy thousand cases of death resulting from suicide, mental, nervous and various organic diseases were subjected to a crude statistical analysis and it was found that during the period 1928–1932, on the average, 3–4 days following a magnetic storm the death rate for suicide, mental, nervous, organic sensory and organic circulatory diseases increased significantly above the rate expected by chance. *Subject Headings:* **1. Cosmic radiation 2. Photobiological effects 3. Geomagnetic disturbances.**

4H–34 551.521.63:551.586:612

Johnson, J. Raymond, Pullock, B. E., Mayerson, H. S. and Laurens, Henry, **The effect of carbon arc radiation on blood pressure and cardiac output.** *American Journal of Physiology*, 114(3):594–602, **1935.** 2 figs., 20 refs. **DLC**—The changes in blood pressure, pulse rate, cardiac output, oxygen consumption and hemoglobin content were studied in a group of dogs and in normal (8) and hypertensive (12) individuals following dosages which in the dogs amounted to 40–60 min at 75–100 cm and in the human beings were 30–90 min at 75–100 cm and produced a definite erythema. In normal men the blood pressure decline was slight and lasted 1–2 days and the cardiac output was increased by 21%. The cardiac output was highest on the 2nd or 3rd day after irradiation and returned to normal on the 5th or 6th day. Oxygen consumption showed insignificant changes. In the hypertensive subjects the systolic blood pressure declined 17 mm and the diastolic 7 mm (6 mm and 8 mm respectively in normal individuals). The cardiac output increased in 21 instances by an average of 30%, decreased in 6 by 23% and remained unchanged in five. The changes in oxygen consumption and pulse rate were slight and inconstant. The hemoglobin counts indicated that increases in cardiac output were accompanied by increases in cardiac blood volume. *Subject Headings:* **1. Carbon arc radiation 2. Blood pressure 3. Oxygen consumption 4. Hemoglobin count 5. Pulse rate 6. Cardiac output.**

4H–35 551.521.63:551.586:612 551.521.11:612

Laurens, Henry, **Photochemistry in medicine.** *Cold Spring Harbor Symposia on Quantitative Biology*, 3:277–298, **1935.** 11 figs., table, 90 refs. **DLC**—This review is concerned primarily with the therapeutic value of UV radiation in human beings. It contains a discussion of the effectiveness of various artificial sources of UV radiation and the erythema test for determining the amount of irradiation applied: the penetration of UV radiation in the skin and its resultant erythemal and pigmentation reactions under various physiological and seasonal conditions; the protective function of the skin against radiant energy; the effect of UV radiation upon the blood and circulation; the photochemical action of UV radiation manifested by its role as an activator (vitamin D); photodynamic sensitization and the conditions due to endogenous sensitization. In the discussion Dr. H. F. Blum makes some observations on a few cases of photosensitivity in man (erythematous dermatitis, eczema solare, urticaria solare and hydroa vacciniforme). Dr. Hausman on seasonal variations in erythemal reactions and Drs. Ellinger and Mayerson on the therapeutic action of UV radiation. *Subject Headings:* **1. UV radiation 2. Photodynamic action 3. Photosensitization 4. Pathological effects 5. Skin diseases 6. Erythema formation 7. Pigmentation. I. Blum, Harold F. II. Ellinger, Friedrich III. Mayerson, H. S.**

4H–36 551.586:612 551.515.8:551.521.63:612

von Philipsborn, Ernst, **Die Wirkung der ultravioletten Strahlen auf den Menschen an Tagen mit verschiedenen Luftkörpern.** [Effect of UV rays upon man on days with different air masses.] *Deutsche Gesellschaft für Innere Medizin, 47th Congress, Munich, Verhandlungen,* **1935.** p. 524–527. 5 figs., ref. **DSG**—Both the intensity of UV radiation and the sensitivity to UV rays is increased during föhn weather. The intensity of UV radiation is diminished but the sensitivity to UV rays is increased during the presence of maritime air masses. *Subject Headings:* **1. Ultraviolet sensitivity 2. UV radiation intensity 3. Föhn weather.**

1936

4H–37 551.521.63:616 551.586:612

Beard, H. H., Bodgers, Thomas and von Hain, E., **Experimental production of malignant tumors in the albino rat by means of ultraviolet radiation.** *American Journal of Cancer,* 27(2):257–266, June **1936.** 8 figs., 30 refs. **DSG** -The authors discuss some of the literature on the general injurious action by UV radiation upon tissues and some of the experimental and clinical evidence on the induction of cancer by UV radiation. Experiments are described in which 30 rats were given 20 hrs of UV radiation daily for one year. The wavelength was above 2800 Å. Sarcomas and carcinomas developed on the eyes, ears and heads of 40% of the experimental animals; cataracts appeared 2 months after irradiation. The pathology of the lesions is described. The inapplicability of these results to man is discussed. *Subject Headings:* **1. Carcinogenesis 2. Short UV radiation.**

4H–38 551.586:612 612.014.43:551.521.63:612

Clark, Janet Howell, **The temperature coefficient of the production of erythema by ultraviolet radiation.** *American Journal of Hygiene,* 24(2):334–342, Sept. **1936.** 2 figs., 2 tables, 14 refs. **DLC**—Solutions of isoelectric protein were exposed to UV radiation at different pH values at 4°C and then brought to 40° and 30°C in water baths. The temperature coefficient for the light denaturation of protein is 1; for the coagulation of radiated protein ranges between 8 and 10. In the human skin the temperature coefficient for the control change produced by UV radiation was approximately 1 and the temperature coefficient of the latent period of erythema production was approximately 2.3 between 30° and 40°C. Accordingly the production of erythema is probably not related to the coagulation of tissue proteins by UV radiation. *Subject Headings:* **1. UV radiation effects 2. Erythema formation.**

4H–39 551.521.63:551.586:612

Crew, W. H. and Whittle, C. H., **Sunburn and windburn.** *Science,* 84(2179):309–310, Oct. 2, **1936.** ref. **DLC**—Preliminary experiments show that strong winds (40 mi/hr) at 66°F with 50% RH in the absence of UV light do not produce reddening or chapping of the skin. Human sweat partially absorbs UV light in the spectral region that produces erythema. The authors conclude that the erythema usually attributed to strong wind may be caused in part by UV light in sunlight "the action of which is intensified by secondary effects of the wind" as for example variation of temperature and moistness of the skin and suppression of sweating. *Subject Headings:* **1. Erythema formation 2. Sweating 3. Wind effects.**

4H–40 551.521.61:551.586:612

Foster, Paul C., **Effect of infrared on tissue temperature gradient as influenced by pigment.** *Society for Experimental Biology and Medicine, N. Y., Proceedings,* 33:62–64, **1935/1936.** 3 tables, 2 refs. **DSG**—Neither natural nor artificial pigment seems to protect deeper tissue layers from excessive heating by infrared amounting to 1.0 gm cal of long infrared (1.4μ to 5.0μ). The slight diminution in heating in heavily artificially pigmented skin is attributed to increased blood flow. *Subject Headings:* **1. Radiation penetration 2. Infrared radiation.**

4H–41 551.521.11:616 551.521.63:551.586:616

Funding, G., Henriques, G. M. and Rekling, E., **Über Lichtkanzer.** [Light cancer.] *International Congress on Light, 3rd, Wiesbaden, 1936,* [*Berichte*], p. 166–168, pub. **1937. DSG**—Irradiation of 240 mice at a distance of 80 cm from a Hanovia lamp with doses of 10 min every 2 days for a period of 8 months produce carcinoma in 95% of the cases. UV light below 3200 Å is necessary for cancer production. Smaller doses produce low percentages of cancerous mice. *Subject Headings:* **1. Short UV radiation 2. Carcinogenesis 3. Mice.**

4H–42 551.521.63:551.586:612:616

†Mayerson, H. S., **Effects of radiation on circulation, blood and metabolism with particular reference to growth, basal metabolism and the thyroid gland.** *Cold Spring Harbor Symposia on Quantitative Biology,* 4:299–317, **1936.** 7 figs., 79 refs. **DLC**—The author reviews various experi-

mental evidence showing that irradiations with carbon arc and to lesser extent with mercury vapor lamp cause a reduction in blood pressure, that carbon arc irradiation increases cardiac output in human beings but decreases it in dogs, and that quartz mercury arc irradiation does not increase hemoglobin levels; the physiological effects of carbon arc and quartz mercury vapor radiation on the individual blood constituents in vivo and vitro are analyzed. Evidence showing that radiation *per se* has no significant effect upon metabolism, growth and thyroid function in human beings, is summarized. The discussion contains comments on the effect of radiation on goiters, on red cell response of the marrow, on gastric secretion, the activating action of UV radiation and the formation of histamine like substance after radiation. *Subject Headings:* **1. Radiation effects 2. Circulatory system 3. Blood 4. Metabolism 5. Growth 6. Digestive system.**

4H–43 551.521.1:551.586:612

Zhikharev, S. S., **Reaktsii kozhi na deĭstvie luchistoĭ energii v vysokogornom klimate.** [Reaction of the skin to radiant energy in a mountain climate.] (In: **Trudy El'brusskoĭ Ekspeditsii Akademii Nauk SSSR i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny, 1934 i 1935.** [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 487–511. 8 figs., 10 tables, 33 refs. English summary p. 510–511. [Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery, Tom II.]) **DLC**—Greater intensity of UV radiation and increased sensitivity of the skin at an altitude above 4300 m accelerate the formation of skin erythema. Diffuse solar radiation and reflected radiation from a snow field produce erythema more slowly than total solar radiation. UV radiations of wave length greater than those producing erythema, produce a grey coloration of the skin. (*Same item as* 2.2–80, Feb. 1951, *MAB.*) *Subject Headings:* **1. Erythema formation 2. Solar radiation 3. UV radiation 4. Mountain bioclimatology.**

1937

4H–44 551.521.9:551.586:612:616

Blum, Harold F. and West, R. J., **Studies of urticarial responses to blue and violet light in man.** *Journal of Clinical Investigation*, Baltimore, 16(2):261–277, **1937.** 11 figs., 3 tables, 31 refs. **DSG**—The characteristics of photo-response, in an individual subject to urticaria solare, to the spectral regions between 3900 and 5300 Å was investigated. The response obeys the reciprocity law. The mechanism of the response consists of a photochemical reaction that is not influenced greatly by temperature, and a thermal reaction that is affected greatly by temperature changes. All parts of the body are sensitive to light. *Subject Headings:* **1. Urticaria solare 2. Photosensitivity 3. Blue light 4. Violet light.**

4H–45 551.521.11:551.586:616

Büngeler, W., **Über die Entstehung von Hautcarcinomen und Hautsarkomen nach Sonnenbestrahlung und Photosensibilierung.** [Development of cutaneous carcinomas and sarcomas as a result of solar radiation and photosensitization.] *Klinische Wochenschrift*, Berlin, 16(29):1012–1013, July 17, **1937.** 2 figs. **DSG**—Nine hundred mice were divided into three equal groups; group I was rendered photosensitive with subcutaneous injections of hematoporphyrins, eosine and dilute anthrasol and exposed to intense sunlight; group II was injected with similar substances but kept in semi-darkness; group III was exposed to strong sunlight without sensitization. In group I skin inflammations appeared: they underwent atrophic and hypertrophic changes and finally developed into neoplasms, papillomas of skin and fibromas of connective tissue. In group II only those treated with anthrasol showed cancer but the incidence was very low, group III showed development of benign tumors but no cancer. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. Solar radiation effects.**

4H–46 551.521.11:551.586:612

Doniach, I. and Mottram, J. C., **Sensitization of the skin of mice to light by carcinogenic agents.** *Nature*, London, 140(3544):588, Oct. 2, **1937.** **DLC**—Mice painted with benzpyrene in benzene become sensitized to light. Exposure of painted mice to sunlight results in illness and dermatitis. Exposure to infrared and UV radiations did not produce these reactions. Only blue-violet light was effective, this corresponds with absorption spectrum of benzpyrene. Similar reactions were obtained with tar and di-benzanthracene. *Subject Headings:* **1. Photosensitization 2. Dermatitis.**

4H–47 551.508.25:551.521.63

Landsberg, Helmut, **The ultra-violet dosimeter.** *American Meteorological Society, Bulletin*, 18(4/5):161–167, April/May **1937.** 8 tables, 29 refs. **MH-BH**—The UV dosimeter developed by POLLAK and FUCHS measures the erythema-producing UV radiation by imitating the photochemical processes occurring in the human body. It uses fuchsine-leucosulfite which has a sensitivity spectrum similar to that of the skin with a maximum at 2910 Å and a minimum at 2750 Å. In the model of POLLAK, the color wedge compensation is replaced with a photocell. The construction of the UV

osimeter (illustrated with a diagram) and its operation are described. Its use for absolute UV eterminations is illustrated. *Subject Headings:* **1. UV dosimetry 2. Pollak UV dosimeter.**

4H–48 551.521.61:616.2:612

Merkelbach, O., **Die biologische Bedeutung der infraroten Strahlen.** [Biological importance infrared rays.] *Helvetica Medica Acta*, Supp. 1 to v. 4, No. 3:7–64, **1937.** 29 figs., 13 tables, fs. **DSG**—This paper presents a comprehensive and critical review of the literature based upon extensive bibliography of existing knowledge on the biological role of infrared rays and the results the author's studies on infrared absorption (0.78–9.8μ) by blood and blood pigments, organic and organic substances. The contents of this review are: transparency and reflectivity of the skin to frared rays; the biological importance of infrared rays—their effect upon skin and muscle diseases nd infectious diseases, and upon vitamin hormones and pigments; physiological effects of infrared ys and their action upon the eye; infrared thermospectrography, infrared photospectrography nd infrared photography; subdivision of the infrared region, investigations with infrared spectro-notography—infrared spectra of various solvents, of various substances dissolved in specifically sorbing solvents, of various amino acids, of blood and blood derivatives and of chlorophyll and lorophyll derivatives. *Subject Headings:* **1. Infrared radiation 2. Blood 3. Skin albedo 4. hysiological effects 5. Therapeutic action 6. Photochemical effects.**

4H–49 551.521.11:612 551.521.61:612 551.521.9:612

Mieschcr, O., **Die Wirkung von sichtbarem und infrarotem Licht auf die Haut.** [Effect of sible and infrared light upon the skin.] *Strahlentherapie*, Berlin, 61:578–585, **1937.** 3 tables. **SG**—Porphyrin produces sensitivity to long UV radiation and visible radiation. Evidence for a ecific effect of infrared radiation upon the skin independently of caloric effect is not convincing. *ubject Headings:* **1. Skin sensitivity 2. Long UV radiation 3. Visible radiation 4. Infrared diation 5. Photosensitization.**

4H–50 551.521.11:612 551.521.61:612

Mohring, R. and Witte, E., **Über den Einfluss des sichtbaren und infraroten Lichtes einer neuen estrahlungslampe auf das Blutbild des Menschen.** [The influence of visible and infrared light om a new radiation lamp upon the blood picture of man.] *Strahlentherapie*, Berlin, 60:142–151, **937.** 6 figs., table. **DSG**—By means of visible and infrared light (up to 1200 mμ) it is possible produce rapid increases in the hemoglobin content and erythrocyte count of the blood as long as e intensities used approximate that of the sun. *Subject Headings:* **1. Infrared radiation 2. Visible diation 3. Blood components.**

4H–51 551.521.63:551.586:612 551.521.11:612

Pincussen, Ludwig, **Effect of ultraviolet and visible rays on carbohydrate metabolism.** *Archives Physical Therapy, X-ray, Radium*, Omaha, 18(12):750–753, Dec. **1937.** 3 figs., table, 8 refs. **SG**—Experiments on animals show that irradiation from a quartz mercury vapor lamp causes a op in blood sugar. However, the glycogen content of the liver and muscle increase and the lactic id content declines so that the quotient carbohydrate/lactic acid increases. The effect of the diation is similar to that of insulin. The carbohydrate that disappeared from the blood is stored s glycogen in the tissues. The carbohydrate metabolism is influenced by the quantity and quality radiation: the highest content of carbohydrate and the highest quotient carbohydrate/lactic acid ppear after application of 1 part UV and 9 parts incandescent light. In diabetic patients the blood gar drops as in normal individuals. The glucose of the urine decreases and may disappear entirely. cetone bodies of the urine behave similarly. The effect is also dependent upon the quantity and uality of the rays. *Subject Headings:* **1. Metabolism 2. UV radiation effects.**

4H–52 551.521.63:551.586:612

Tarras-Wahlberg, T., **Über den Histamingehalt der Haut nach Ultraviolettbestrahlung.** [His-mine content of the skin after UV irradiation.] *Klinische Wochenschrift*, Berlin, 16(27):958–960, uly 3, **1937.** 2 figs., table, ref. **DSG**—In experiments with cats and rabbits the histamine content skin was determined after irradiation with UV light from a mercury vapor lamp by extraction with ichloracetic acid and biological titration of the extract. In cats the histamine content of the skin minished after several hours and days following irradiation; in rabbits the histamine content emed to increase within 2 days after irradiation but decreased after 3–4 days. *Subject Headings:* **UV radiation effects 2. Skin 3. Histamine content.**

1938

4H–53 551.521.63:551.586:612

Albus, G. and Feldermann, F., **Der Einfluss der Ultraviolettbestrahlung auf die Antigen-Anti-örperreaktion der Haut (Cutanprobe).** [The influence of UV radiation upon the antigen-antibody

reaction of the skin (skin test).] *Klinische Wochenschrift*, Berlin, 17:702–703, May 14, 1938. **DSG**—In previous investigations ALBUS has shown that the sensitivity of skin test for determining the presence of antigen in allergy cases is enhanced by the non-specific irritation caused by a previously administered Omnadin injection. Exposure to intense solar radiation blocks the skin reaction regardless of whether the back on which the test was made, or chest or abdomen was irradiated. The skin reactions were considerably stronger in fall and winter than in summer. The variation in skin reactions are attributed to the suppressive action of UV radiation upon the antigen-antibody reaction effected by the production of thiol compounds during irradiation. *Subject Headings:* **1. UV radiation effects 2. Skin 3. Antigen-antibody reaction.**

4H–54 551.521.63:612 551.521.11:61

Amelung, Walther and Kuhnke, Wolfgang, **Die biologische Bedeutung der ultravioletten Strahlung im direkten und diffusen Sonnenlicht.** [The biological importance of UV radiation in direct and diffuse sunlight.] *Deutsche Medizinische Wochenschrift*, Stuttgart, 64(38):1345–1349, Sept. 16, **1938.** 8 figs., 23 refs. **DSG**—The author discusses the biological role of various regions of the solar spectrum, the relationship between solar and sky radiation, the share of the latter in the total radiation and the effects produced by solar and sky radiation, including erythema production, pigmentation and therapeutic effects. It is concluded that although a considerable portion of long UV produces erythema, artificial light sources are not equal to sunlight in their biological effectiveness. The sky radiation is of very great bioclimatic importance; its share in the total UV radiation is particularly large during the transition months and is the principle cause of the relatively high UV concentration in this period. *Subject Headings:* **1. Long UV radiation 2. Photobiological effect 2. Solar radiation 4. Sky radiation 5. Erythema formation 6. Therapeutic action 7. Artificial UV radiation.**

4H–55 551.586 551.521.63:612 551.508.21:551.521.6

†Buettner, Konrad, J. K., **Physikalische Bioklimatologie.** [Physical bioclimatology.] Leipzig, Akademische Verlagsgesellschaft, **1938.** 155 p. 167 refs. **DLC**—The first part of this systematic treatise on the physical processes involved in maintaining the thermal balance of the human body is concerned with the physical properties and chemical and biological effects of radiation, in particular of UV radiation, upon the human skin. The topics discussed are: the weakening and transformation of the various wave lengths of solar radiation in their passage through the atmosphere; the characteristics of infrared and black body radiation in the open air and in enclosed areas; the penetrability of the skin by radiation of various wave lengths; the specific effect of UV radiation such as erythema, vitamin D synthesis and destruction of bacteria; the biological effects of other regions of the spectrum; the UV climate as resulting from the influence of latitude upon solar and sky radiation and of elevation above sea level; the normal values of UV radiation and the infrared climate. A description of various instruments for measuring the heat and light intensities of solar and sky radiation and the intensity of UV radiation is given. *Subject Headings:* **1. Erythema formation 2. Infrared radiation 3. UV climate 4. Radiation bioclimate 5. UV dosimetry 6. Radiation measurement 7. Photobiological effects 8. Textbooks.**

4H–56 551.521.9:612:616 551.586:61

Eugster, J., **Zur Frage der biologischen Wirkung der harten Ultrastrahl-Schauer.** [The problem of the biological effect of hard cosmic ray showers.] *Naturwissenschaften*, 26(5):78–79, Feb. 4, **1938.** 2 figs., ref. **DLC**—Eight month old female guinea pigs were kept for a period of 4 months under a 15 mm thick lead screen with optimal shower formation on the Hafelekar near Innsbruck (2340 m above sea level). Controls were not protected by a lead screen. The females became either sterile or produced still births. Histological changes observed in the experimental animals are described. *Subject Headings:* **1. Photobiological effects 2. Reproductive system 3. Guinea pigs.**

4H–57 551.521.63:612 551.586:61

Hausser, Isolde, **Über spezifische Wirkungen des langwelligen ultravioletten Lichts auf die menschliche Haut.** [Specific effects of long wave UV light upon human skin.] *Strahlentherapie*, Berlin, 62:315–322, **1938.** 3 figs., 10 refs. **DSG**—The skin of human subjects was irradiated from a radiation source with a distribution of intensity from 300 mμ similar to that of the sun. Besides the known maximum of erythema and pigment formation at 298 mμ, a region of specific radiation effect at 385 mμ which differs from the temporal course of erythema and pigmentation was observed. During irradiation with the spectral region 330–700 mμ an intense deep red erythema forms; the long wave limit is at 420 mμ; a new intense reddening occurs at 385 mμ and two less pronounced effects at 360 and 408 mμ. The nature of the temporal transition from erythema to pigmentation at 385 mμ differs from that at 298 mμ. The energy required to produce erythema at 385 mμ is 500 times that at 298 mμ. *Subject Headings:* **1. Long UV radiation 2. Erythema formation 3. Pigmentation.**

4H–58 551.521.11:551.586:612

Jausion, H., **Die Rolle der biologischen Katalysatoren bei den Lichtkrankheiten.** [Role of biological catalysts in light diseases.] *Strahlentherapie*, Berlin, 63(1):15–32, **1938. DSG**—A review of the knowledge of the role of endogenous catalysts in the production of photosensitivity. The author discusses the porphyrins, carotinoids, oxyflavone, anthocyanine, melanin, protein derivatives, purine pigments and the actual role of the catalysts in light diseases. *Subject Headings:* **1. Photosensitivity 2. Photopathology 3. Catalysts.**

4H–59 551.521.63:551.586:612

†Laurens, Henry, **Physiological effects of ultraviolet radiation.** *American Medical Association, Journal*, 111(26):2385–2392, Dec. 24, **1938.** 86 refs. **DLC**—A concise summary of the fundamental physiological effects of ultraviolet radiation upon human beings and upon bacteria and protozoa and of the mode of action of UV radiation. The author discusses the antirachitic effects on the body, the "burns" produced by UV radiation and the variation of sensitivity to UV with age, sex, season, glandular activity, etc., the erythermal reaction, fermentation reaction, absorption and transmission of UV radiation by the eye and its effect upon the eye, the effect of UV radiation upon blood circulation, metabolism and growth, and mineral metabolism; photodynamic or optical sensitization and the pathological effects of UV radiation; the bactericidal action of UV rays and their action upon protozoa, proteins and enzymes; and the photochemical reaction produced by UV rays. *Subject Headings:* **1. UV radiation effects 2. Photosensitization 3. Antirachitic effects 4. Circulatory effects 5. Metabolism 6. Germicidal effects.**

4H–60 551.521.11:612 551.521.63:612 551.586:612

†Merkelbach, O., **Photobiologische Fragen.** [Photobiological problems.] *Schweizerische Medizinische Wochenschrift*, 68(46):1245–1250, Nov. 12, **1938.** 92 refs. **DSG**—A discussion based upon an extensive bibliography of the erythema formation and of pigmentation, the individual regions of the UV spectrum, light sickness, photosensitization, antagonism of individual radiations, the individual forms of respiration enzyme and the photochemical processes occurring in the retina during the act of seeing. *Subject Headings:* **1. Light sickness 2. Erythema formation 3. Pigmentation 4. Photosensitization.**

4H–61 551.521.63:551.586:612

Mitchell, J. S., **The origin of the erythema curve and the pharmacological action of ultra-violet radiation.** *Royal Society of London, Proceedings, Ser. B*, 126(843):241–261, **1938.** 2 figs., table, 10 eqs. Append. by J. S. Mitchell and C. B. Allsopp. **DLC**—The literature dealing with the origin of the erythema curve and with the physiological changes in the skin induced by UV radiation is reviewed. The hypothesis that the erythemal response is due to photochemical decomposition of a cell constituent of the stratum corneum with liberation of active reaction products is developed mathematically on the basis of a model in which the epidermis consists of two strata of uniform thickness. It is shown that the form of erythema curve calculated within the limits of experimental error from absorption measurements of a typical protein and of the human stratum corneum with the aid of the theoretical equation: $W_\lambda = \frac{(e10^{-D})\lambda}{(e10^{-D})} \times 100$ (where W = relative thermal efficiency and D = apparent optical density of stratum A) agrees closely with the observed erythema curve. *Subject Headings:* **1. UV radiation effects 2. Erythema formation 3. Erythema curve. I. Allsopp, C. B.**

4H–62 551.581:612 551.521.3:551.521 551.586:612

Pfleiderer, H., **Strahlungs-Bioklima.** [Radiation bioclimate.] *Zeitschrift für technische Physik*, Leipzig, 19(11):386–389, **1938. DLC**—The author discusses the atmospheric conditions which constitute the radiation climate, including absorption of radiation by atmospheric gases, scattering by atmospheric molecules, scattering reflection and absorption by aerosols, mutual interaction of different spectral regions and UV and heat injury. *Subject Headings:* **1. Radiation bioclimate 2. UV radiation.**

4H–63 551.521.11:616 551.521.63:616 551.586:616

Taussig, Joseph, Cooper, Zola K. and Seelig, M. G., **Effect of light on benzpyrene cancer in mice.** *Surgery, Gynecology and Obstetrics*, 66(6):989–993, June **1938.** 2 figs., table, 25 refs. **DSG**—The authors review the literature on the effect of light sensitizing agents on experimental carcinogenesis. One hundred and fifty female mice were divided into 3 equal groups and painted with benzpyrene. One group was also injected with hematoporphyrin. Two groups were exposed to light from a lamp transmitting a band of rays between 2894 and 5500 Å; one group was kept in darkness. The incidence of skin cancer in the 2 groups was not sufficiently marked to indicate that

light had any effect upon carcinogenesis. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. Long UV radiation 4. Short UV radiation.**

4H–64 551.521.11:612 551.586:612 551.521.63:612

Woltereck, Heinz (*ed.*), **Klima, Wetter, Mensch.** [Climate, weather, man.] Leipzig, Quelle und Meyer, **1938.** 446 p. **DLC**—In the chapter "Grundzüge der Bioklimatik des Menschen" (by B. DE RUDDER, p. 126–229) the author discusses in non-technical language the effect of the radiation climate upon man. The degree of penetration into the skin of UV, visible and infrared radiation; the physiological effects of UV radiation as manifested in erythema and pigment formation and their varying character depending upon race, sex and age; influence of the vegetative nervous system and season; antirachitic effect of UV radiation and vitamin D production are discussed. *Subject Headings:* **1. Radiation bioclimate 2. Erythema formation 3. Pigmentation 4. Nervous system 5. Antirachitic effects. I. von Brezina, C. II. Hellpach, W. III. Hesse, R. IV. Martini, E. V. de Rudder, Bernhard VI. Schittenhelm, A. VII. Seybold, A. VIII. Weickmann, L.**

1939

4H–65 551.521.63:551.586:616

Baumann, Carl A. and Rusch, Harold P., **Effect of diet on tumors produced by ultraviolet light.** *American Journal of Cancer*, 35(2):213–221, Feb. **1939.** 7 tables, 30 refs. **DSG**—Cutaneous tumors in the external ear were induced by UV radiation of albino mice kept on five standard diets. Tumors were produced most rapidly on a fat diet, while brain extract or liver retarded tumor production. A 2% supplement of cholesterol to the diets did not accelerate the rate of tumor production although a marked increase in liver fat and cholesterol resulted. No relation was found between the cholesterol content of blood, liver, kidney, ears or skin and the production of tumors on various diets. In the rat the increase in cholesterol content of the skin was common to both exposed and protected portions. No increase in cholesterol content of skin occurred in the mouse or guinea pig. *Subject Headings:* **1. Carcinogenesis 2. UV radiation 3. Dietetic effects.**

4H–66 551.508.25:551.521.63:551.586:612

Coblentz, W. W., **The unit of dosage and standard of ultraviolet radiation in therapy.** *Fundamenta Radiologica*, 5(3/4):85–88, **1939.** table, 8 refs. English, German and French summaries. **DSG**—In standardizing the dosage it is necessary to specify the UV energy flux (the intensity or density) per unit area and the time of exposure (the dosage). The unit of dosage should be in terms of the threshold of erythema (M.P.E.). The author sets up as a unit intensity of erythemal flux 1 Finsen (F. or F.U.), an intensity of $10\mu W/cm^2$ of the wave length 2967 Å, and as a unit intensity of erythemal dosage 1 Finsen second or for longer exposures 1 Finsen minute corresponding to 100 ergs/cm² or 6000 ergs/cm², respectively. As a primary standard stimulus, the author proposes the wave length 2967 Å of the hot quartz mercury arc lamp and as a secondary standard the new hot quartz mercury arc with activated electrodes. The erythemogenic equivalent is:

$$1 \text{ F.U.} = 10\mu W/cm^2 (\lambda 2967 \text{ Å}) = 60\mu W/cm^2$$

(λ3132 Å and shorter wave lengths from the hot quartz mercury arc lamp). *Subject Headings:* **1. Erythema formation 2. UV dosimetry 3. Short UV radiation 4. Finsen unit.**—*From author's abstract.*

4H–67 551.521.9:612

Düll, Bernhard and Düll, T., **Kosmisch-physikalische Störungen der Ionosphäre, Troposphäre und Biosphäre.** [Cosmic-physical disturbances of the ionosphere, troposphere and biosphere.] *Meteorologische Zeitschrift, Bioklimatische Beiblätter*, 6(2, 3):65–76, 131, 134, **1939.** 22 figs. **DWB**—The authors stress the fact of the periodic appearance of penetrating corpuscular and wave radiations in the ionosphere and troposphere and that these radiations have biologic effects. The first article contains a discussion of the physical properties of the sun including its surface features and its spectrum; the origin and properties of cosmic radiation, the relationship between cosmic radiation and sunspots, eruptions in the chromosphere, aurora borealis and geomagnetic disturbances; the biological action of cosmic rays and of secondary radiations such as a rise in the mutation rate of Drosophila melanogaster, a decline in the fertility of guinea pigs and in the regeneration rate of skin epithelium of guinea pigs; the structure of the ionosphere and of its disturbances, the characteristics of the C and D layers, the nature of the wave propagation disturbances caused by solar eruptions, the causes of the origin of electrical "parasites" in the ionosphere, the formation of "penetrating electrons" in the ionosphere; variations and disturbances of the earth's magnetic field and their relationship to the occurrence of "clicks" and "whistlers" and to the occurrence of "elementary geomagnetic waves"; the aurora borealis and its possible biologic action such as intensification of rheumatic pains, etc. In the second article the authors discuss the relationship of the troposphere to solar eruptions

and ionospheric processes including that between solar activity, aurora borealis and cirrus clouds and haloes, solar activity and tropospheric temperatures and precipitation, and the relationship between solar activity, ionosphere, geomagnetic and barometric pressure in the troposphere; the relationship between solar activity and tropospheric electricity. The biological effects of these rays are presumably similar to those of X and radium rays. The biological action of high frequency electric waves upon nervous activity is illustrated by the effect upon a nerve-muscle preparation and upon colloids. *Subject Headings:* **1. Cosmic radiation 2. Photobiological effects.**

4H–68 551.521.11:612

East, B. R., **Mean annual hours of sunshine and incidence of dental caries.** *American Journal of Public Health*, 29(7):777–780, July **1939.** 2 figs., table, 13 refs. **DLC**—An attempt to establish a correlation between caries incidence and annual amount of hours of sunshine. In white boys, 12–14 years of age living in rural and semirural areas of 24 states, the mean caries incidence varies inversely with the hours of sunshine prevailing at their place of residence. The group residing in the area having over 3000 hours of sunshine per year had 290.50 cavities/100 boys; the 2600–2999 hour group, 323.0; the 2600–2599 group, 375.65, and the group with less than 2200 hours 485.75, cavities/100 year. *Subject Headings:* **1. Dental caries 2. Solar radiation.**

4H–69 551.521.11:551.586:612

Edwards, F. A. and Duntley, S. G., **Analysis of skin pigment changes after exposure to sunlight.** *Science*, 90(2332):235–237, Sept. 8, **1939.** fig., table, ref. **DLC**—The pigmentary changes in skin of an individual exposed for an hour to sunlight was studied by means of the Hardy recording spectrophotometer over a period of 9½ months. The first effect of radiation was hyperemia which was an acute reaction that regressed rapidly: blood stagnation, however, persisted and was still detectable at the end of 9½ months. An increase in melanin was apparent in a few days; it reached a maximum on the nineteenth day and at the end of a month it began to diminish. The melanin increases for some time and then diminishes. *Subject Headings:* **1. Pigmentation 2. Solar radiation effects.**

4H–70 551.521.63:551.586:612

Ellinger, Friedrich, **The influence of ultra-violet rays on the body weight.** *Radiology*, St. Paul, Minn., 32(2):157–160, Feb. **1939.** 2 figs., 9 refs. **DSG**—White mice both abundantly and scantily nourished manifested a loss in body weight when exposed to UV radiation. This phenomenon is attributed to an increase in the activity of the thyroid gland. This seems to provide additional evidence for the histamine theory of response to UV radiation. *Subject Headings:* **1. Endocrine effects 2. Body weight 3. UV radiation effects.**

4H–71 551.521.63:551.586:612:616

Ellinger, Friedrich, **Ultraviolettlicht und Krebs.** [UV light and cancer.] *Fundamenta Radiologica*, 4(1/2):181–189, **1939.** 2 tables, 31 refs. **DSG**—Irradiation with UV light amounting to doses one or two times greater than the erythemal threshold for white mice stimulates the growth of implanted tumors (Ehrlich's carcinoma) in white mice. This growth stimulating effect appears to be connected with the erythemal effectiveness of the radiation. This phenomenon is explained by means of the hypothesis of histamine production by UV rays. A parallelism is pointed out between carcinogenic rays and carcinogenic carbohydrates as well as the experimentally demonstrated fact that the UV rays do not have a specific carcinogenic effectiveness. The avoidance of sunburn is recommended as a practical prophylactic measure. *Subject Headings:* **1. Erythema formation 2. Carcinogenesis 3. Histamine formation 4. Sunburn 5. UV radiation effects.**

4H–72 551.521.11:612

Hager, B. G., **Koprophyrinausscheidung im Spontanharn des Menschen unter dem Einfluss von Belichtung.** [Coprophyrin excretion in spontaneous urine during irradiation.] *Klinische Wochenschrift*, Berlin, 18(31):1045–1048, Aug. 5, **1939.** 22 refs. **DSG**—The photobiological properties of the porphyrins and the importance of photodynamic action to the endocrine vegetative system are discussed. The effect of radiation by UV lamp and artificial radiation of various wave lengths upon the 24 hour porphyrin excretion of individuals with various chronic diseases (circulatory, intestinal, cancer, etc.) and of normal individuals is investigated. The results show that the excretion of coprophyrine in the urine is increased by irradiation, especially with red light (transmission of filters for rays of approximately 600–700 mμ 500 watt lamp). *Subject Headings:* **1. Photodynamic action 2. Urine excretion.**

4H–73 551.521.63:551.586:612

Hamperl, H., Henschke, U. and Schultze, Rudolf, **Über den Primärvorgang bei der Erythemerzeugung durch ultraviolette Strahlung.** [The primary process in erythema formation by UV radiation.] *Naturwissenschaften*, 27(27):486, July 7, **1939.** 2 figs., ref. **DSG**—Radiation below

315 mμ destroys the nucleic acids in the superficial epidermal cell nuclei so that the nuclei cannot be stained. The production of erythema hence begins with the destruction of the nuclei acids. The absorption curve of nucleic acids superposed by the transmission curve of the horny layer of the skin yields the erythema curve of HAUSSER and VAHLE. The gradation of erythema for different wave lengths is explained by the assumption of a photochemical primary reaction in the nucleic acids of cell nuclei; the deeper the radiation penetrates, the more cell nuclei are affected and the greater is the macroscopic reaction. The maximum and minimum of erythema curve was determined by the arc of a continuous spectrum of a hydrogen discharge; the former was at 295 mμ and the latter 275 mμ. The importance of histamine production in the formation of erythema is mentioned. *Subject Headings:* **1. Erythema formation 2. Erythema curve 3. Biochemical radiation effects.**

4H–74 551.521.63:551.586:612

Hart, Deryl and Sanger, Paul W., **Effect on wound healing of bactericidal ultraviolet radiation from a special unit.** *Archives of Surgery*, Chicago, 38(5):797–805, May **1939.** 4 figs., 3 tables, 5 refs. **DLC**—"Wounds in animals exposed for from ten to ninety minutes to bactericidal radiation, as it is used to sterilize the air in the operative field, healed as well as control wounds if not better. Exposure of the peritoneum to this intensity of radiation from thirty to ninety minutes produced a damage demonstrable by adhesions, edema or increased fluid in the cavity. Subsequent operations on over 1000 patients with the wound exposed to an intensity of radiation at least as great as this have caused no demonstrable harm to the skin, peritoneum, meninges or other tissues exposed. The wounds heal with less reaction and less risk of infection and there is less systemic reaction." *Subject Headings:* **1. Germicidal effects 2. Wound healing 3. UV radiation effects.**—*Author's summary.*

4H–75 551.521.63:551.586:612

Henschke, U. and Schultze, Rudolf, **Über Pigmentierung durch langwelliges Ultraviolett.** [Pigmentation by long wave UV.] *Strahlentherapie*, Berlin, 64(1):14–42, Jan. **1939.** 14 figs., 11 tables, 86 refs. **DSG**—Filter and monochromatic experiments on the effectiveness of UV radiation above 320 mμ show that direct pigmentation without preceding erythema is produced. The action curve of direct pigmentation has long wave boundary between 430 and 460 mμ: it then rises slowly up to 340 mμ and has a steep short wave boundary at 300 mμ. The minimum latency period is shorter than 2 min and the maximum of direct pigmentation is reached after 30 min to 1 hr. The gradation of direct pigmentation is very flat as compared with that of erythema and subsequent pigmentation. Individual sensitivity is very variable and is independent of sensitivity to medium and short UV radiation. Scattering of dosage reduces effectiveness. Adaptation to long wave UV radiation is specific. In the absence of skin edema direct pigmentation fails to occur. *Subject Headings:* **1. Pigmentation 2. Long UV radiation.**

4H–76 551.521.63:551.586:612

Henschke, U. and Schultze, Rudolf, **Wirkung der Sonnenstrahlung auf die Haut.** [Effect of solar radiation upon the skin.] *Strahlentherapie*, Berlin, 64(1):43–58, Jan. **1939.** 5 figs., 2 tables, 30 refs. **DSG**—Besides erythema formation by UV radiation below 320 mμ there occurred also direct pigmentation by UV radiation above 320 mμ which is particularly strong in solar radiation. These reactions are easily distinguishable. The threshold time for pigmentation is shorter than for erythema. On the Jungfraujoch the average of the threshold of direct pigmentation was reached in 14 min, that of erythema in 40 min. At lower elevations the attainment of the threshold of direct pigmentation was about the same, and that of erythema was slightly longer. No differences were found between high mountains and lowland. The gradation curve of erythema is very steep while that of pigmentation very flat. Pigmentation capacity of the sun is 4 times that of normal UV radiation. The spectral solar action curves for erythema and pigment formation were separated by filters and they agree with calculated curves. *Subject Headings:* **1. Long UV radiation 2. Erythema threshold 3. Pigmentation 4. Erythema formation.**

4H–77 551.521.11:551.586:616

Holtz, F., **Das Licht in seiner Bedeutung für die experimentelle Krebsforschung.** [Significance of light in experimental cancer research.] *Strahlentherapie*, Berlin, 66:712–715, **1939.** 8 refs. **DSG**—A brief review of the development of sarcomas induced in mice and rats by UV and by intense solar radiation. The histologic characteristics are described. The observations of REICHLING on rats are presented. *Subject Headings:* **1. Carcinogenesis 2. UV radiation 3. Solar radiation.**

4H–78 551.521.11:551.586:612

Hudlett, Leny, **Untersuchungen über die Abhängigkeit der Erythembildung von klimatischen Faktoren.** [Investigation on the dependence of erythema formation upon climatic factors.] *Fundamenta Radiologica*, 5(1/2):15–30, **1939.** 2 figs., 11 tables, 39 refs. French and English summaries. **DSG**—The summer UV intensity on the North Sea and its dependence upon cloudiness are dis-

ussed. Studies on solar erythema show that the erythema threshold of the skin depends upon ooling power. The sensitivity is small during great cooling and is large during simultaneous varming. Erythema is not greater after a cold sea bath than during normal conditions. The solar rythema is not much greater along the beaches. *Subject Headings:* **1. Erythema formation 2. Cooling power.**

4H–79 551.521.11:616

Jausion, H., **Die wichtigsten Gesetze und die neuesten Ergebnisse der Photopathologie.** [The most important laws and most recent results of photopathology.] *Strahlentherapie*, Berlin, 65(4): 569–578, Aug. **1939. DSG**—A summary of knowledge on the pathological effects of light. Possible physical, physiological and biochemical processes involved in the action of light, and the possible occurrence of light catalyzers in the body are discussed; diseases caused by light are divided into 2 classes, phototropism and photophylaxis. *Subject Headings:* **1. Photopathology 2. Photophysiology.**

4H–80 551.508.25:551.521.63:612 551.586:612

Langen, Dietrich, **Über die Vergleichbarkeit der mit dem Dosimeter gemessenen UV-Werte. (Zugleich Bemerkung zu der Arbeit über die Erythembildung bei Sonne- und Himmelsstrahlung in dieser Zeitschrift Bd. 63(8), S. 142.)** [Comparability of UV-values measured with the dosimeter. (A note on the study "On erythema formation during solar and sky radiation" in this journal v. 63(8), p. 142.)] *Strahlentherapie*, Berlin, 66:530–534, **1939.** 8 refs. **DSG**—Considerable sources of error are present in the measurement of UV intensities owing to the varying color sensitivities of the individual observers during colorimetric reading. The results of dosimeters are relative values. Also the quartz test tubes manifest variable differences in sensitivity. In order to compare dosimeter readings these must be reduced to the color sensitivity of an "average" observer and to the 1938 standardized instrument sensitivity. This procedure is applied to previously analyzed erythema studies. The average erythema dose at noon is approximately 280 dosimeter units. *Subject Headings:* **1. UV dosimetry 2. Erythema dose.**

4H–81 551.521.63:551.586:612

Luckiesh, Matthew and Taylor, A. H., **Production of erythema and tan by ultraviolet energy.** *American Medical Association, Journal*, 112(24):2510–2511, June 17, **1939.** fig., 2 refs. **DLC**—The authors established a spectral "tanning effectiveness" curve and extended the spectral erythemal curve in the long wave region. High energy densities were obtained "by focusing the image of the arc of an S-1 lamp in quartz or Corex bulb through quartz lenses onto the area of the subject using various glass filters to limit the wave length region incident on the skin." The curve was established on the basis of the exposure of 18 male subjects between the ages of 25 and 35. The energy of waves longer than 3300 Å, especially 3650 Å produces a direct tanning effect. *Subject Headings:* **1. Long UV radiation 2. Spectral erythema curve 3. Erythema formation 4. Pigmentation.**

4H–82 551.521.63:551.586:612

Meyerson, Abraham and Neustadt, Rudolph, **Influence of ultraviolet irradiation upon secretion of sex hormones in the male.** *Endocrinology*, 25(1):7–12, July **1939.** 2 figs., 13 refs. **DSG**—UV radiation from a quartz mercury vapor lamp increased the excretion of androsterone in urine of patients in depressive states. Irradiation of the scrotum and its vicinity proves to be more effective than irradiation of other parts of the skin. *Subject Headings:* **1. Endocrine effects 2. UV radiation effects.**

4H–83 551.508.25:551.521.63 551.508.21

Mörikofer, W., **Meteorologische Strahlungsmessmethoden für Mediziner und Biologen.** [Meteorological radiation methods for physicians and biologists.] *Fundamenta Radiologica*, 4(1/2):36–52, **1939.** 10 figs., 17 refs. English, French and German summaries. **DSG**—The various methods for measuring the radiation from the sun and sky which are simple and not too expensive are described. They include calorimetric methods for measuring direct solar radiation, calorimetric methods for measuring global radiation of sun and sky, selective methods for measuring visible radiation of sun and sky and methods for measuring UV radiation of sun and sky. The limit of error is assumed to be ±10%. In determining of instantaneous values of radiation from sun and sky the author proposes the rectifier-photocell, the double thermometer within a common glass envelope, thermoelectric pyranometers and solarimeters, and for UV radiation the UV dosimeter. In measuring the daily amounts of radiation he recommends the bimetallic actinograph, the distillation-ucimeter, and gray-wedge photometer and the solarimeter combined with a milliampere-hour-counter. *Subject Headings:* **1. Radiation measurement 2. Solar radiation measurement 3. Global radiation measurement.**

4H–84 551.521.63:551.586:616

Rusch, Harold F. and Baumann, Carl A., **Tumor production in mice with ultraviolet irradiation.** *American Journal of Cancer*, 35(1):55–62, Jan. **1939.** table, 5 figs., 13 refs. **DSG**—Adult male albino and black mice were exposed to UV radiation from a quartz mercury lamp. Of the albino mice irradiated 30 to 60 min a day 62 to 83% developed tumors in 3½ to 9 months. The rate of tumor development was greater the longer the period of irradiation. Black mice developed a smaller percentage of tumors than albino and the time required was greater. The pathology of the papillomas, epitheliomas and spindle cell sarcomas produced is described. *Subject Headings:* **1. Carcinogenesis 2. UV radiation effects.**

4H–85 551.586:551.521.11 551.508.25:551.521.63 551.521.63:612

Saidman, Jean, **Introduction aux problèmes biologiques relatifs à la climatologie de radiation.** [Introduction to biological problems related to radiation climatology.] *Fundamenta Radiologica*, 5(1/2):31–35, **1939.** German, French and English summaries. **DSG**—The author briefly reviews the various diseases due either to a deficiency or abundance of sunlight and proposes a close collaboration among meteorology, actinology and medical statistics in order to sketch the task of bioclimatology. As physiological tests he recommends the measurement of skin sensitivity to UV radiation, the thermal reactions to intradermal injections of histamine, skin temperature and the tonus of the sympathetic and parasympathetic nervous system. The latency period between irradiation and biological response must be investigated. *Subject Headings:* **1. Skin sensitivity 2. Nervous system 3. Latency period 4. Radiation bioclimatology.**

1940

4H–86 551.521.11:551.586:616

†Blum, Harold F., **Photodynamic action and diseases caused by light.** *American Chemical Society, Monograph Series*, v. 85, **1940.** 309 p. **DLC**—In this book there is a brief critical review of the clinical and experimental evidence on the induction of skin cancer in man and animals by sunlight and UV radiation. The principal literature between 1894 and 1939 is cited. The work of Roffo on the production of skin cancer by UV radiation and his ideas on the relation of cholesterol to skin cancer are discussed in particular. *Subject Headings:* **1. Carcinogenesis 2. Photopathology.**

4H–87 551.521.11:551.586:616

Blum, Harold F., **Sunlight and cancer of skin.** *National Cancer Institute, Washington, D. C., Journal*, 1(3):347–419, **1940.** 3 figs., 2 tables, 62 refs. **DSG**—A comprehensive and critical review of experimental and clinical evidence on the cancerogenic properties of sunlight with particular reference to human beings. The author presents the evidence from animal experiments including distribution and types of tumors, the active wave lengths, and the energies required for tumor production; the geographical distribution of sunlight and the incidence of cutaneous cancer in man, the topographical distribution of cutaneous cancer and its relation to sunlight, namely: distribution of cancer of the skin on the face, factors determining the effect of sunlight on different areas of the face, the character of skin cancer (blonds and brunets, xeroderma pigmentosa), the mechanism of cutaneous cancer production including the mechanism of photobiological effects in general, the action of radiation upon human skin, the sunburn mechanism and cancer, sterols and cancer, and photosensitization. *Subject Headings:* **1. Solar radiation 2. Skin cancer 3. Sunburn mechanism 4. Photosensitization.**

4H–88 551.521.63:551.586:612

Broekmüller, A., **Über die Beeinflussung des Blutkalkspiegels durch Quartzlampenbestrahlung.** [Influence of quartz mercury vapor lamp irradiation on blood calcium.] *Klinische Wochenschrift*, 19:1255, **1940.** **DSG**—Extensive solar irradiation increases the blood calcium content even when erythema formation is avoided. The increase in blood calcium was on the average 0.5 mg% and it was greater during the time of increase which was poorer in sunshine than in the summer. When the calcium offered with food is insufficient the bone calcium is mobilized during irradiation. Irradiation does not act as rapidly as intravenous calcium injection but produces a hypercalcemia of longer duration. *Subject Headings:* **1. Blood calcium 2. Solar radiation effects 3. Quartz mercury vapor lamp radiation.**

4H–89 551.521.11:551.586:616

Doniach, I. and Mottram, J. C., **On the effect of light upon the incidence of tumors in painted mice.** *American Journal of Cancer*, 39(2):234–240, June **1940.** 8 figs., 12 refs. **DSG**—The literature on the effect of light upon the experimental tumors produced by tar and benzpyrene is reviewed critically. Experiments in which mice were painted with benzpyrene or cholanthrene and

exposed to the dark, to sun via glass, to direct sunlight and to ordinary light on the animal house are described. Tumors of the skin are produced by benzpyrene and cholanthrene in the absence of light. Darkness reduces dermatitis but does not inhibit tumor production or increase hair growth. Sunlight coincident with benzpyrene increases dermatitis but reduces tumor production. It is suggested that the inhibiting effect of strong sunlight upon the production of tumors of the skin in mice by benzpyrene may be associated with the photodynamic (light-sensitizing) property of the hydrocarbon. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. Solar radiation.**

4H–90 551.521.11:551.586:616

Morton, John J., Luce-Clausen, Ethel M. and Mahoney, Earle B., **Effect of visible light on development of tumors induced by benzpyrene in skin of mice.** *American Journal of Roentgenology*, 43(6):896–898, June **1948.** table, 5 refs. **DSG**—Mice of Swiss albino and Bar Harbor strain were painted with 3–4 benzpyrene; one group was exposed to visible light produced by fluorescent light, and the other was kept in darkness. In the group exposed to light a retardation of the carcinogenic process and a diminution in the number of animals which developed tumors were observed. The authors suggest that the effect of visible light differs from the carcinogenic effect of UV radiation. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. Visible radiation effects.**

4H–91 551.586:616 551.521.11:616 551.521.63:616

Peller, S., Stephenson, C. E. and Sander, C. G., **Cancer in its relation to climatic conditions acting during childhood and adolescence.** *American Journal of Hygiene, Ser. A*, 32(1):39–43, July **1940.** 2 graphs, 3 tables, 7 refs. **DLC**—In the U. S. Armed Forces in the group born south of 40° latitude 49.9% of all their malignancies originated in the skin or lip while in the group born north of this latitude the incidence of this type of cancer was 27.4%. The high frequency of cancer of the skin or lip is illustrative of exposure to dermotropic climatic conditions, such as actinic rays, cosmic rays, during childhood, adolescence and youth; it accounts for the low frequency of internal cancer and low total cancer mortality of the age groups 20–64 in Armed Forces. Exposure to these climatic irritants during adolescence and youth is more important in its effect upon the frequency of surface cancer and hence upon the incidence of internal cancer then is exposure during early manhood. *Subject Headings:* **1. Carcinogenesis 2. Skin cancer 3. Climatic effects.**

4H–92 551.521.11:551.586:616

Teutschlaender, O., **Licht und Hautkrebs.** [Light and cutaneous cancer.] *Zeitschrift für Krebsforschung*, 50(1):81–92, **1940.** 4 figs., 23 refs. **DSG**—Reviews critically the literature on the photosensitizing properties of coal tar in the production of skin cancer and disputes the hypothesis that photodynamic activity is a prerequisite for the formation of cancer by coal tar. Also presents results of experiments on mice showing that skin cancer arises solely through the action of coal tar without the participation of UV radiation. *Subject Headings:* **1. Carcinogenesis 2. Photosensitizing substances 3. Skin cancer.**

1941

4H–93 551.521.11:551.586:616

Apperly, Frank L., **The relation of solar radiation to cancer mortality in North America.** *Cancer Research*, 1(3):191–195, March **1941.** 5 figs., table, 14 refs. **DSG**—The author investigated the relationship of solar radiation and air temperature to the total cancer mortality and skin cancer mortality among the white population of the United States and Canada. The total cancer mortality declined with increasing solar radiation and with increasing numbers of people exposed thereto. Skin cancer mortality increases with increasing exposure to solar radiation when mean annual temperature is 42°F. It is concluded that solar radiation produces a sort of immunity to cancer in general and to skin cancer where the mean annual temperature is below 42°F. The data are summarized graphically. *Subject Headings:* **1. Carcinogenesis 2. Solar radiation.**

4H–94 551.521.11:616 551.521.63:616 551.586:616

Blum, Harold F., **Photodynamic action and diseases caused by light.** New York, Reinhold Publ. Co., **1941.** 309 p. **DLC**—A systematic account of the experimental and theoretical aspects of photodynamic action and diseases caused by light in men and in domesticated animals. The author discusses the physical and photochemical aspects of radiant energy, the biological effects of radiation, including the kinds of photobiological effects of short and long wave lengths, "antagonism" of radiation of different wave lengths, the causes and characteristics of photodynamic action; light absorption in photodynamic action, the role of oxygen in photodynamic action, the mechanism of photodynamic action, factors determining apparent photodynamic effectiveness, types of photodynamic action and the relationships between photodynamic action and other photobiological processes and diseases produced by light in animals and in man. *Subject Headings:* **1. Photodynamic action 2. Photosensitivity 3. Visible radiation 4. UV radiation.**

4H–95 551.586:612.275

†Düll, Bernhard, **Wetter und Gesundheit. Teil 1.** [Weather and Health, Pt. 1.] Dresden, Theodor Steinkopf, **1941.** 100 p. 64 illus., 88 refs. **DLC**—In section IV "Critical remarks on the nature of the physical-chemical physiological mechanism of the biological effectiveness of atmospheric and solar energy transformations" pp. 70–84, the author discusses the apparent meteoro-psychological-physiological and pathological effects manifested by human beings under conditions excluding the influence of the meteorological variables. The cause of these effects is attributed to the "atmospheric electric parasites," to the secondary radiations resulting from "runaway electrons," namely penetrating beta and gamma radiation, and to cosmic radiation. The biological effects of atmospheric corpuscular and gamma radiations are regarded as analogous to the observed X-ray and radium sickness manifested by irradiated individuals. It is suggested that the absorbed "atmospheric electrical parasites" and the penetrating radiations influence the vegetative nervous system and thereby produce their bioclimatic effects. *Subject Headings:* **1. Cosmic ray effects 2. Nervous system.**

4H–96 551.521.63:612 551.586:612:615.8

†Ellinger, Friedrich, **Biological fundamentals of radiation therapy.** New York, Elzevier Publ. Co., **1941.** 360 p. 79 figs., biblio. **DLC**—A comprehensive survey of the literature dealing with the results and problems of radiation biology which are especially relevant in radiation therapy. The first and second parts cover: 1) the action of Roentgen rays and gamma (γ) radiation of radium, and 2) the action of corpuscular rays, respectively. Pt. 3 covers the direct effects of UV light, namely, sunburn or photoerythema, photopigmentation, photoadaptation, antirachitic effect, photosensitivity of the skin, effects upon blood network, muscles, eye; the indirect effects of UV radiation such as effects on metabolism, respiration, circulation, blood, endocrine organs, stomach, respiratory tract, kidneys, body temperature and on the psyche; and the biclogical action of visible light and infrared rays, sensitization and diseases caused by light. The bibliography of 1100 items covers primarily the literature since 1930. *Subject Headings:* **1. Visible radiation 2. Infrared radiation 3. UV radiation 4. Physiological effects 5. Therapeutic action 6. Pathological effects.**

4H–97 551.521.63:612 551.521.11:612 551.521.61:612 551.586:615.8

†Laurens, Henry, **The physiological effects of radiant energy.** *Annual Review of Physiology*, Palo Alto, 3:21–40, **1941.** 138 refs. **DLC**—In this review of the literature the author discusses the relation between specific effects of shorter and longer wave UV radiation and the production of erythema and tan, the contrasts between the action of sunlight which is rich in longer UV and poor in the shorter UV, and the energy emitted by various artificial sources; the pigmentary changes in the skin after irradiation by sunlight; the relationship between UV irradiation and sunlight and histamine production in the skin and the penetration of red and infrared rays into the skin; the effect of UV upon the circulation, upon hemoglobin content, and number of red and white cells after irradiation of blood; the relation between coagulation time of blood and various wave lengths; the action of UV and luminous rays upon metabolism; the photodynamic action of sunlight, and the action of UV rays in the production of skin cancer in man. The review covers the literature between 1938–1940 and includes 138 references. *Subject Headings:* **1. Physiological effects 2. Radiation penetration 3. Infrared radiation 4. Short UV radiation 5. Long UV radiation 6. Solar radiation 7. Carcinogenesis 8. Photodynamic action.**

4H–98 551.508:551.521.63:615.8 551.586

Stružka, Vladimir, **Ergänzungen zur Gebrauchsanweisung für die Messung mit dem UV-Dosimeter (I. G. Farben) zu bioklimatischen Zwecken.** [Supplementary instructions for making measurements with the UV dosimeter for bioclimatic purposes.] *Zeitschrift für Meteorologie, Bioklimatische Beiblätter*, 8(1):15–16, **1941.** fig. **DWB**—In order to eliminate the errors in the UV dosimeter resulting from duration of exposure (higher UV values being obtained with longer exposure and lower ones with brief exposures) the author gives a table of illumination duration for any time of the day during the year; the table is valid for clear and sunny days, for latitude 50° and moderate elevations. Errors due to temperature can be minimized by excluding measurements made at temperatures above 25°C and below 15°C. The comparability of measurements can be increased by excluding measurements made under cloudy conditions. *Subject Heading:* **1. UV dosimetry.**

4H–99 551.521.11:551.586:612

Stühmer, A., **Sonne und Haut.** [Sun and skin.] *Gesundheitsführung des Deutschen Volkes*, Munich, No. 4:141–145, April **1941.** **DSG**—A thin, flabby and pale skin is due to neglect of the skin as a light receptor. Very intense solar irradiation of the skin increases the quantity of blood in superficial surface of the skin and may cause undesired removal of blood from the interior organs. Although intense sunshine is harmful, mild skin reactions are desirable. Tanning is a defense mechanism. Even on individuals who do not tan, the solar irradiation is very effective. There is a

light adaptation which is independent of pigmentation. Light influences not only vitamins but also the glands of internal secretion. Sedatives such as the barbiturates increase sensitivity to light. *Subject Headings:* **1. Circulatory system 2. Pigmentation 3. Photosensitivity.**

1942

4H–100 551.586:612 551.521.11:551.506:612

†Berman, H. and Stokes, J. H., **Photodynamic effects in dermatology. Part II.** *American Journal of Medical Sciences,* 204(4):601–624, Oct. **1942.** biblio. **DSG**—This review contains a comprehensive discussion of the clinical and experimental evidence on the induction of cutaneous cancer by sunlight in human beings, rats and mice. The important clinical and experimental studies from 1894 to 1942 are cited. An extensive bibliography is given. *Subject Headings:* **1. Carcinogenesis 2. Solar radiation effects.**

4H–101 551.521.63:551.586:616

Blum, Harold F. and Grady, Hugh G., **Relationship between dosage and rate of tumor indication by ultraviolet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 3(1):91–97, Aug. **1942.** fig., 10 refs., 9 eqs. **DSG**—Above a dose of 10^8 ergs/cm²/week there is a minimum induction time which cannot be decreased by increasing the weekly dose; below this dose the time of induction increases with diminishing dosage. The induction time is reduced if the same weekly dose is given in smaller, more frequent exposures. The intensity was varied between 4.3×10^4 and 4.2×10^3 ergs/cm²/sec without affecting time of induction. The relationship between dose and rate of tumor induction was analyzed quantitatively taking into account the following factors: screening effect of epidermis, components of induction time, hyperplasia, tissue destruction, age and body weight. *Subject Headings:* **1. Carcinogenesis 2. UV radiation.**

4H–102 551.521.63:551.586:616

Blum, Harold F. and Lippincott, Stuart W., **Carcinogenic effectiveness of ultraviolet radiation of wavelength 2537 Å.** *National Cancer Institute, Washington, D. C., Journal,* 3(2):211–216, Oct. **1942.** 2 figs., table, 7 refs. **DSG**—Male strain albino mice were exposed to UV radiation of wave length 2537 Å. Tumors were induced only by the maximum dosage of 36×10^7 ergs/cm²/week. One tenth of this dosage of wave length 3000 Å produced a similar effect. In terms of dosage wave length 2537 Å is less effective than longer wave lengths in inducing tumors and other effects since it is absorbed primarily in the stratum corneum before it reaches the viable cells. The locus of carcinogenic action of UV radiation is the living cell. *Subject Headings:* **1. Carcinogenesis 2. Short UV radiation.**

4H–103 551.521.63:551.586:616

Blum, Harold F., Grady, Hugh G. and Kirby-Smith, John S., **Limits of accuracy in experimental carcinogenesis as exemplified by tumor induction with ultraviolet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 3(1):83–89, Aug. **1942.** 4 figs., 2 tables, 6 refs. **DSG**—This article deals with the statistical aspects of the data obtained in the experimental induction of cancer in white mice when the variation in individual induction time within groups of animals is very wide. The logarithm of induction time is distributed normally among individual male strain albino mice. By plotting probits for percent, straight line regression lines are obtained. A table giving the number of animals required for statistical significance and indicating accuracy of numbers used is presented. *Subject Heading:* **1. Carcinogenesis.**

4H–104 551.508:551.521.63

Henschke, U. and Schultze, Rudolf, **Methoden zur Ausmessung von Ultravioletts trahlen.** [Methods of measuring UV rays.] *Strahlentherapie,* Berlin, 71(4):656–681, Oct. **1942.** 11 figs., 2 tables, 41 refs. **DSG**—The authors discuss the properties of the various types of receivers, namely: cadmium photocell, selenium photoelement and the fulfillment of the cosine law, measurement of spectral distribution, spectral distribution with monochromators, measurement of larger spectral regions by means of the spectroscope, use of filters, use of differential filters and comparison of various methods for measuring the spectral regions in the UV, and measurements with apparatus, the sensitivity of which resembles spectral methods—apparatus for measuring erythema and the directly pigmenting radiation. *Subject Headings:* **1. UV radiation measurement 2. UV dosimetry.**

4H–105 551.521.63:551.586:616

Kirby-Smith, John S., Blum, Harold F. and Grady, Hugh G., **Penetration of ultraviolet radiation into skin as factor in carcinogenesis.** *National Cancer Institute, Washington, D. C., Journal,* 2(5): 403–412, April **1942.** 5 figs., 15 refs. **DSG**—The authors describe a method for measuring the transmission of UV radiation through separated epidermis; the epidermis is illuminated with a

collimated beam of monochromatic radiation and whole of the emerging radiation is estimated photoelectrically. Wave lengths shorter than 3200 Å which alone have carcinogenic action, pass through the epidermis of the albino mouse to a considerable degree. Transmission is less in mice irradiated repeatedly than in normal mice. The production of tumors of thermal origin in these animals is accounted for by the large fraction of the incident radiation that penetrates the dermis. "The transmission of these wave lengths by human epidermis is much lower than for mouse epidermis and almost none reaches the dermis of well-tanned skin. This agrees well with the fact that virtually all human cutaneous tumors of exposed areas are epidermal in origin." *Subject Headings:* **1. Radiation penetration 2. Carcinogenesis 3. Short UV radiation.**

4H–106 551.521.63:551.586:616:612

Lippmann, Arthur, **The effect of irradiation with ultra-violet rays and short waves upon metabolism and insensible perspiration.** *Medical Journal of Australia,* 2:77–81, Aug. 1, **1942.** 3 tables, 21 refs. **DSG**—Skin irradiated with UV radiation manifests a rise of temperature which is noticeable an hour before the appearance of erythema. UV radiation produces a decline in insensible perspiration which precedes the onset of erythema and is intensified with the development of erythema. Two hours following erythema, the subject showed a slight increase in oxygen consumption which had not returned to normal the following day although the erythema persisted. "Cooling experiments show that the reflex mechanism of conduction of the skin arterioles is unaffected by UV irradiation." Hence, the changes in insensible perspiration are due to local changes in the skin. Irradiation with short waves insufficient to produce either pyrexia or sweating caused a rise in oxygen consumption and a decrease in insensible perspiration independently of any changes in the skin. *Subject Headings:* **1. UV radiation effects 2. Insensible perspiration 3. Erythema formation 4. Oxygen consumption.**

1943

4H–107 551.521.63:551.586:616

Bain, J. A. and Rusch, H. P., **Carcinogenesis with ultraviolet radiation of wave length 2800–3400 Å.** *Cancer Research,* 3(7):425–430, July **1943.** 3 figs., table, 17 refs. **DSG**—The authors describe the experimental procedure and the filter employed in irradiating young adult ABC mice of both sexes with wave lengths between 2800 Å and 3400 Å. The mice were irradiated in three groups, each receiving different daily doses of 0.38, 0.76 and 1.35×10^7 ergs/cm². Ear tumors were induced by exposure to wave length band 2800–3400 Å. More energy was required at these wave lengths to produce carcinogenesis than when entire mercury spectrum was used. Small amounts of energy applied daily over a long period of time seemed more efficient in inducing tumors than large doses given during shorter periods. *Subject Headings:* **1. Long UV radiation 2. Carcinogenesis.**

4H–108 551.521.63:551.586:616

Bain, J. A., Rusch, H. P. and Kline, B. E., **Effect of temperature upon ultraviolet carcinogenesis with wave lengths 2800–3400 Å.** *Cancer Research,* 3(9):610–612, Sept. **1943.** fig., table, 10 refs. **DSG**—One group of ABC mice of both sexes was irradiated with wave lengths 2800–3400 Å while kept at a temperature of 35–38°C. The other group was kept at a temperature of 3–5°C while being irradiated. A third group was irradiated at room temperature 23°C. All groups received a daily dose of 0.75×10^7 ergs/cm² 30 min a day, 6 days a week. The production of tumors was more efficient at 35–38°C than at room temperature; there was no difference between carcinogenesis at room temperature and at 35°C. *Subject Headings:* **1. Short UV radiation 2. Long UV radiation 3. Temperature effects 4. Carcinogenesis.**

4H–109 551.521.63:551.586:616

Blum, Harold F., **Accuracy and reproducibility in the induction of tumors with ultraviolet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 4(1):75–79, Aug. **1943.** 2 figs., table, 9 refs. **DSG**—Under given experimental conditions, i.e. the exposure of male strain A mice to UV radiation of high intensity with a particular spectral distribution, a high reproducibility of tumors is obtained. Data on rate of tumor development in different experimental groups are analyzed statistically and the degree of accuracy to be expected in the reproduction of results is discussed. An analysis of the dose response curve indicates that there is a minimum of time for tumor induction under a given schedule of exposures which cannot be reduced by increasing the dose per exposure. The time to 30% incidence of tumors is affected by the age of animals so that accuracy of reproducibility would be reduced by considerable ranges in age. *Subject Headings:* **1. Carcinogenesis 2. UV radiation.**

4H–110 551.521.63:551.586:616

Blum, Harold F., **Effect of intensity on tumor induction by ultraviolet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 3(5):539–543, June **1943.** fig., 2 tables, 8 refs. **DSG**—

lice were exposed to the same dose of UV radiation at varying intensity. Above 4×10^3 ergs/cm²/sec he effectiveness of UV radiation in inducing tumors is virtually independent of intensity; below this mit effectiveness diminishes with reduced intensity. Since not only the total amount of radiation of ave lengths shorter than 3200 Å must be considered but also the intensity, induction of tumor by nlight should depend upon geographical latitude. The mechanism of the intensifying effect on lls is discussed. *Subject Headings:* **1. Carcinogenesis 2. Tumor induction dose 3. Short UV adiation.**

4H–111 551.521.63:551.586:616

Blum, Harold F., **Fundamental aspects of tumor development illustrated by studies with ultraiolet radiation.** *National Cancer Institute, Washington, D. C., Journal*, 3(5):569–581, June **1943.** figs., 8 refs., 8 eqs. **DSG**—The induction of cutaneous tumors by UV radiation was studied by eans of experiments in which repeated exposures to the radiation were discontinued after varying xposures or were interrupted for specified intervals and then resumed. A minimum number of xposures are required for the development of tumors. Continued repeated exposures accelerate umor development, and discontinuance of exposure delays development. The development of the umors is analyzed mathematically by means of the growth curve. On the basis of this analysis the uthor proposes a theoretical explanation of the control of tumor growth and the factors determining evelopment time. *Subject Headings:* **1. Carcinogenesis 2. Tumor induction dose 3. UV adiation.**

4H–112 551.521.63:616:612:016

†Blum, Harold F., **Physiological and pathological effects of ultraviolet radiation.** *Annual Review of Physiology*, Palo Alto, 5:1–16, **1943.** 103 refs. **DLC**—A review of the literature for the nterval 1939–1942 dealing with the physiological and pathological effects of radiation within the pectral region 2800 Å–4000 Å. Systemic effects resulting from the superficial action of UV radiation nd not produced specifically by this agent are omitted. Also therapeutic and sanitary uses of UV adiation are excluded and photochemical studies on biological materials are touched upon only in a ew instances. The review involves the following aspects: the light absorber, susceptibility, mutaions, all division and growth, respiration and action upon protein synthesis; effects on specialized ells; effects on skin including erythema, sunburn, abnormal sensitivity and effects on the eye. *ubject Headings:* **1. Erythema formation 2. Photobiological effects 3. Biochemical radiation ffects 4. Photosensitivity.**

4H–113 551.521.63:612 551.586:612

Blum, Harold F., Grady, Hugh G. and Kirby-Smith, John S., **Effect of ultraviolet radiation n body weight of mice.** *American Journal of Physiology*, 138(2):378–384, **1943.** fig., table, 10 efs. **DSG**—Two or three months old inbred mice were exposed to UV radiation of wave lengths horter than 3200 Å from an intermediate pressure arc enclosed in quartz. UV radiation below 200 Å slows the natural gain in weight and even causes the decrease in body weight of mice. Below certain dose the weight did not decrease. No evidence of growth stimulation in any dosage was btained. The extent to which body weight is influenced depends upon total dosage and interval etween doses, but within the limits investigated intensity of radiation is not a factor. The decline n weight gain is traceable to decreased consumption of food and is parallel to the damage to the cells f the skin. Evidence brought forward shows that the corneum is not involved in the photochemical rocesses leading to the reduction in body weight; it acts as a semi-opaque screen which protects he deeper layer. The radiation affects directly the living tissues of the skin. *Subject Headings:* **. Body weight 2. Short UV radiation 3. Photobiological effects.**

4H–114 551.521.63:551.586:616

Grady, Hugh G., Blum, Harold F. and Kirby-Smith, John S., **Types of tumor induced by ltraviolet radiation and factors influencing their relative incidence.** *National Cancer Institute, Vashington, D. C., Journal*, 3(4):371–378, Feb. **1943.** 5 figs., 3 tables, 7 refs. **DSG**—A histopathoogic study of tumors induced in mice by ranging dosages of UV radiation. The tumors induced were: pindle cell sarcomas, polymorphous cell sarcomas, squamous carcinomas, hemangio-endotheliomas, nd a sebaceous sarcoma. The authors discuss the ratios of sarcomas to carcinomas, their relationship o dose of UV radiation and to frequency of exposure. With increasing frequency of exposure arcinoma/sarcoma-ratio increases. *Subject Headings:* **1. Carcinogenesis 2. UV radiation.**

4H–115 551.521.63:551.586:612

Graham, John S., **Adrenal cortex and blood pressure response to carbon arc irradiation.** *American Journal of Physiology*, 139(4):604–611, Aug. **1943.** 3 figs., table, 14 refs. **DLC**—Adult normal dogs were irradiated with a carbon arc lamp emitting 0.820 gm cal/cm²/min with a distribution of 5–6% UV, 29–31% luminous and 63–66% infrared; the dosage used was 40 gm cal/cm². After

irradiation the average decline in blood pressure was 16% systolic and 23% diastolic. Removal of both adrenal glands caused a reduction of 16% systolic and 66% diastolic. Administration of adrenal cortical extract or desoxycorticosterone acetate prevented fall of blood pressure in normal animals and reduced it in adrenalectomized animals. Red blood cell concentration was reduced by 7% in normal and 8% in adrenalectomized animals; the reduction was prevented by adrenal cortical substances. No changes in blood sugar or plasma potassium concentration were observed. It is suggested that a humoral mechanism is responsible for drop in blood pressure. *Subject Headings:* **1. Circulatory system 2. Blood 3. Carbon arc radiation.**

4H–116 551.521.63:551.586:616

Lippincott, Stuart W., **Neoplasms and other lesions of the eye induced by ultraviolet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 3(5):545–554, June **1943.** 6 figs., 9 refs. **DSG**—A description of the histopathology of tumors and various lesions of the eye induced by exposure to UV radiation. Author discusses the possible etiologic role of tumors and lesions of the tissues of the eye. *Subject Headings:* **1. Carcinogenesis 2. Eyes 3. UV radiation effects.**

4H–117 551.521.11:612:616

O'Brien, B., **Some biological effects of solar radiation.** *Smithsonian Institution, Annual Reports,* **1943.** p. 109–134. 28 figs., 2 plates. **DSG**—A non-technical discussion of the radiation energy of sunlight, the thermal effect of the red and near infrared, the production of erythema by UV radiation, the antirachitic effect of sunlight, bactericidal action of UV radiation and the relationship between ozone and UV absorption. *Subject Headings:* **1. Erythema formation 2. Antirachitic effects 3. UV radiation 4. Solar radiation.**

4H–118 551.521.63:551.586:616

Rusch, H. P., Kline, B. E. and Baumann, C. A., **Nonadditive effect of ultraviolet light and other carcinogenic compounds.** *Cancer Research,* Baltimore, 2(3):183–188, March **1943.** 4 tables, 28 refs. **DSG**—The number of tumors were not increased in ABC mice by UV radiation after they had been rendered precarcinogenic with methyl cholanthrene, 9, 10-dimethyl-1, 2 benzanthracene. Likewise various hormones and dyes failed to increase the number of tumors induced by UV radiation. UV radiation failed to increase the carcinogenic action of the Shope papilloma virus. The various experimental modifications and results are presented in tables. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. UV radiation effects.**

4H–119 551.521.61:551.586:616

Watkins, Arthur L., **Infra-red urticaria.** *Archives of Physical Therapy, X-ray, Radium,* 24(5): 291–294, May **1943.** 2 figs., 9 refs. **DSG**—The report of a case of urticarial reaction resulting from exposure to sunlight and luminous and infrared heating lamps. The active spectrum was limited to the infrared chiefly in the wave lengths 7,900 to 14,000 Å. *Subject Headings:* **1. Urticaria solare 2. Infrared radiation.**

1944

4H–120 551.521.63:551.586:616

Blum, Harold F., **Growth rate and development of tumors induced with ultra-violet radiation.** *National Cancer Institute, Washington, D. C., Journal,* 4(6):359–369, June **1944.** 2 figs., 6 tables, 11 refs., 2 eqs. **DSG**—An analysis of the importance of the rate of tumor cell proliferation in the development of ear tumors induced in white male mice by UV radiation. The measurement of the growth rates is described and the method is based upon the equation for experimental growth. The growth rate does not remain constant during gross development of tumors and varies in tumors of the same type. The growth rates of the gross tumors are the same for early and late appearing tumors and are not correlated with the age of the animals or with recency of exposure to UV radiation. An analysis of the effect of interruption of schedule of exposures upon development time indicates that growth and regressive processes determine the time it takes for a tumor to become established and time its growth. It is concluded that tumor cells do not grow autonomously but that their growth rate is controlled to a considerable degree by its tissues. The implications to cancer control are considered. *Subject Heading:* **1. Carcinogenesis.**

4H–121 551.521.11:551.586:616

Schrek, Robert, **Cutaneous carcinoma. IV. Analysis of 20 cases in Negroes.** *Cancer Research,* 4(3):119–127, Feb. **1944.** 3 figs., 4 tables, 18 refs. **DSG**—A report of 20 cases of cutaneous cancer in Negro male patients. The incidence of cutaneous carcinoma in white and colored male patients is discussed and the location of the lesions with reference to the influence of sunlight is considered. Pre-existing inflammatory lesions and scars are described with reference to their role in the etiology of carcinoma. A table illustrating the incidence of cutaneous carcinoma in white and colored

ersons in northern and southern sections of the U. S. is given. *Subject Headings:* **1. Carcinogenesis Skin cancer 3. Racial influences 4. Solar radiation effects.**

4H–122 551.521.11:612

Wels, Paul, **Die Wirkung des Lichtes auf den Menschen.** [The effect of light upon man.] *trahlentherapie*, Berlin, 75(2/3):188–215, Sept. **1944.** 56 refs. **DSG**—A comprehensive and critical eview of the manner in which light exerts its influence on the physiological processes of human eings. The discussion includes the photochemical origin of active substances (antirachitic vitamin, istamine action upon circulatory systems); the sulfhydril hypothesis of the actions of light (experiients with dyes and supposed mode of action of dyes). *Subject Headings:* **1. Photobiological effects Antirachitic effects 3. Histamine formation.**

1945

4H–123 551.521.11:612 551.586:612 551.521.63:612 551.521.61:612

†Blum, Harold F., **Physiological effects of sunlight on man.** *Physiological Reviews*, 25(3):483–30. July **1945.** 4 figs., 3 tables, 261 refs. **DLC**—A comprehensive and critical review of the scienfic literature on the specific physiological effects of sunlight impinging directly upon the human rganism with special reference to the chemical interaction between tissues and radiation. The hysics of sunlight, namely the spectral distribution of sunlight in the atmosphere, the depth of enetration of different wave lengths into the skin and eye and its reflection and emission by the uman skin are summarized. The discussion of the physiological effects of sunlight which involve pecific effects initiated by a photochemical reaction and non specific or "radiant heat" effects covers he following items: effects on the skin, namely sunburn, the formation of vitamin D, cutaneous ancer and photosensitization by the action of wave lengths in the UV and of the spectrum and by he infrared radiation, the injurious action of sunlight upon vision (photophthalmia cataract formaon) and systemic effects. *Subject Headings:* **1. Solar radiation effects 2. Photosensitivity 3. Phodynamic action 4. Carcinogenesis.**

4H–124 551.521.9:551.586:616

George, E. P., George, M., Booth, Joan and Horning, E. S., **Influence of cosmic radiation on nduced carcinogenesis in mice.** *Nature*, London, 164(4181):1044–1045, Dec. 17, **1945.** 2 tables, refs. **DLC**—The effect of cosmic radiation on carcinogenesis in mice was investigated on the ungfraujoch. Two hundred and fifty mice were inoculated with methylcholanthrene and equal roups were exposed in a tunnel under 60 m of rock (control group), in a cosmic ray chamber and in a milar chamber shielded with 2 cm thick lead screen. Total ionization measured was negligible and as greater in tunnel than in shielded cosmic ray chamber. The results were inconclusive. The xperiments of FIGGE were repeated at sea level but his results were not confirmed. The late period f appearance of cancer in controls, shielded and non-shielded animals showed a random variation. *ubject Headings:* **1. Carcinogenesis 2. Cosmic radiation.**

4H–125 551.521.63:551.586:613.15

Wheeler, S. M., Ingraham, H. S., Hollaender, Alexander, Lill, N. D., Gershon-Cohen, J. and Brown, E. W., **Ultra-violet light control of air-borne infections in a nasal training center.** *American ournal of Public Health*, 35(5):457–468, May **1945.** 6 figs., 4 tables. **DLC**—"Ultraviolet irradiaon of the floors and upper air of barracks was accompanied by a 25 percent reduction of respiratory llness in those barracks equipped with high intensity sources (225 watts of UV-energy for dormitory eeping quarters per 112 men) as compared with illness in adjacent control barracks." This effect as most marked during winter when the reduction of respiratory illness in irradiated barracks mounted to approximately 35% as compared to controls. Streptococcal illness and carrier rates ere at a low level and were not reduced further by irradiation. Irradiation was accompanied by a 0% reduction of bacterial counts from air samples. Beta hemolytic streptococci isolated from air nd dust were more frequent in control than in irradiated barracks. The reduction of illness in radiated barracks was marked only in the first months of the study period. *Subject Headings:* **Common cold 2. Germicidal effects 3. UV radiation effects.**

1946

4H–126 551.521.63:551.586:616

Blum, Harold F., **Studies in hypersensitivity to light. II. Urticaria solare** ($\lambda < 3700$). *Journal f Investigative Dermatology*, Baltimore, 7(2):99–107, April **1946.** 2 figs., 4 tables, 17 refs. **DSG**—Vave lengths studies on a case of urticaria solare show that it is produced by wave lengths in the nterval 3130 Å–3650 Å. This condition is a distinct biological entity. Photosensitivity induced ocally in normal skin by injection of the urticaria solare patient's serum has the same wave length

limit. It is suggested that "the light absorber which is constantly present in the patient's skin and the light absorbers in the area of normal skin photosensitized by passive transfer have the same absorption spectra and therefore are presumably identical." *Subject Headings:* **1. Urticaria solare 2. Long UV radiation.**

4H–127 551.521.11:612 551.586:612 551.521.63:612

Blum, Harold F. and Terus, William S., **Erythemal threshold for sunburn.** *American Journal of Physiology*, 146(1):107–117, **1946.** 2 figs., 2 tables, 17 refs., 12 eqs. **DLC**—In this study of the erythemal threshold the authors analyze the physical and physiological factors that determine it. Intermediate pressure and low pressure mercury arcs in which intensities were controlled by photocell arrangements were used. A geometric series of doses was chosen because the ratio of increment to dose is constant regardless of the positions of the threshold in the dosage range. Theoretical expressions are derived for the erythemal threshold for monochromatic and polychromatic radiation. The threshold of a given individual was found to vary from time to time. Sweating and wetting of the skin did not affect the threshold. The reciprocity law holds for monochromatic radiation within the limits of measurement, but not for polychromatic radiation. Transmission by the corneum, absorption by the malpighian layer and sensitivity of the cells of the malpighium and the inherent limitations of a standard erythema spectrum are discussed. *Subject Headings:* **1. Radiation penetration 2. Erythemal threshold 3. Erythema formation.**

4H–128 551.521.63:551.586:612

Blum, Harold F. and Terus, William S., **Inhibition of erythema of sunburn by large doses of ultraviolet radiation.** *American Journal of Physiology*, 146(1):97–106, April **1946.** 4 figs., 2 tables, 8 refs. **DLC** Small areas of normal skin of thorax and abdomen were exposed to series of doses of short (2537 Å), long (3130, 3026 and 2967 Å) and mixed UV radiation. The doses ranged from below the threshold of perceptible erythema to those producing severe desquamation. An optimum dosage for producing erythema is established with higher doses either delaying the development of erythema or causing it to recede temporarily. The inhibition is accompanied by greater total damage to the cells and can be explained as a direct effect upon the superficial blood vessels while "the erythema itself depends upon the release of dilator substance by the injured cells of the epidermis." *Subject Headings:* **1. Erythema formation 2. UV radiation effects.**

4H–129 551.521.6:551.586:616

Blum, Harold F., Barnsdale, E. E. and Green, H. G., **Urticaria solare** (λ4000–5000Å). *Journal of Investigative Dermatology*, Baltimore, 7(2):109–115, April **1946.** fig., table, 15 refs. **DSG**—The production of urticaria solare by blue and violet light, wavelengths 4000 Å to 5000 Å in an urticaria patient is described. This wave length range elicits no response from normal skin and the type of urticaria produced constitutes a distinct etiological entity. Passive transfer successful in cases of urticaria solare $\lambda < 3700$ Å failed. It is suggested that the development of the urticaria depends upon the absorption of wave lengths between 4000 and 5000 Å by a carotinoid substance. Photosensitivity was greatest in areas of skin covered by clothing and least in exposed parts. *Subject Headings:* **1. Urticaria solare 2. Long UV radiation 3. Photosensitivity.**

4H–130 551.521.11:551.586:616

Blum, Harold F., Eicher, Maynard and Terus, William S., **Evaluation of protective measures against sunburn.** *American Journal of Physiology*, 146(1):118–125, **1946.** 2 figs., 5 refs., 11 eqs. **DLC**—The sources of radiation were the intermediate pressure mercury arc with corex filter and the carbon arc with "therapeutic C" carbons. The protection was evaluated by determining the amount of radiant energy required (Q_p) "to produce a comparable degree of erythema on an area of skin covered by a layer of the preventive to be evaluated and on an unprotected area of adjacent skin (Q)." The ratio of these two energy values P is the index of protection. Expressions are derived for P for monochromatic and polychromatic radiation, namely: $P = e^{a_p \lambda l_p}$;

$$P = \frac{t_p}{t} = \frac{\dfrac{hcD_q}{\gamma}\displaystyle\int_u^v \frac{d\lambda}{e^{-a_p\lambda l_p} e^{-a_c\lambda l_c}(1-e^{-a_m\lambda l_m})k_\lambda \lambda}}{\dfrac{hcD_q}{\gamma}\displaystyle\int_u^v \frac{d\lambda}{e^{-a_c\lambda l_c}(1-e^{-a_m\lambda l_m})k_\lambda \lambda}}$$

respectively. In these equations $A_{p\lambda}$ is the attenuation coefficient of the preventive; l_p—thickness of the layer. The protection afforded by various fabrics, natural protection and the differences in the estimation of protection, provided by sunburn preventives, obtained by different methods are discussed. *Subject Headings:* **1. Sunburn protection 2. Erythema formation.**

4H–131 551.586:612 551.506:551.521.63:612

†Hollaender, Alexander, **Effects of ultraviolet radiation.** *Annual Review of Physiology*, Palo Alto, :1–13, **1946.** 121 refs. **DLC**—A review of the literature on the biological effects of UV radiation nd visible radiation from the period 1943 to July 1945. The principal subjects discussed are: JV microscopy; effects of UV radiation upon cell constituents such as proteins and viruses, bacteria nd upon higher organisms such as protozoa, sea urchin eggs, etc.; the carcinogenic effects of UV adiation in mice; the action of UV radiation upon mitosis; the use of UV for the treatment of blood y the "Knott Technique" for healing bacterial infections and in controlling air-borne cross infections n schools, hospital operating rooms, etc. and the effect of UV upon the eye. *Subject Headings:* . **"Knott technique" 2. Therapeutic action 3. Germicidal effects 4. UV radiation effects.**

4H–132 551.521.63:614 551.521.61:614 551.586:612

Luckiesh, Matthew, **Applications of germicidal, erythemal and infrared energy.** New York,). Van Nostrand, **1946.** 463 p. **DSG**—A comprehensive treatise on the physical properties of the iologically effective regions of the solar spectrum and of their biological action. The contents of his volume cover: a description of the wave lengths of the solar spectrum, the properties of direct unlight and of sky light, the production of erythema and tan, units and luminology for biological ffectiveness, germicidal energy, disinfection of controlled air and of air in occupied interiors, the isinfection of water, artificial sunlight, UV energy and plant life, measurement of UV energy, etc. *ubject Headings:* **1. Germicidal effects 2. Erythema formation 3. Infrared radiation effects . UV dosimetry.**

1947

4H–133 551.521.11:551.586:616

Beal, Peter L., **Urticarial hypersensitivity to sunlight.** *Society of Experimental Biology and Medicine, Proceedings*, 66(2):470–471, Nov. **1947.** 6 refs. **DSG**—Two patients that responded to unlight exposure with severe urticarial reaction were irradiated through a set of Corning glass lters in order to determine by the use of a monochrometer the wave length from a mercury arc pectrum to which the skin is sensitive. In both cases the range of sensitivity was between 2967 nd 3341 Å with a maximum at 3131 Å. The urticarial sensitivity could be transferred passively. t is suggested that the absorption of specific wave lengths causes the formation of a photochemical roduct in the skin of all persons; but individuals with solar urticaria develop a sensitivity by forming ntibodies against this normal metabolite. *Subject Heading:* **1. Urticaria solare.**

4H–134 551.521.63:551.586:616

Engelbreth-Holm, J. and Iversen, S., **The effect of ultraviolet irradiation on the carcinogenic otency of certain hydrocarbons.** *Cancer Research*, 7(6):372–378, July **1947.** 6 figs., table, 20 refs. **)SG**—The carcinogenic hydrocarbons 1, 2, 5, 6-dibenzanthracene, 3, 4-benzpyrene, 9, 10-dimethyl-1, -benzanthracene and methylcholanthrene were irradiated from a 350 watt mercury quartz lamp, nd the irradiation products were tested for carcinogenic potency by painting and subcutaneous njection of mice, the oxidizing product of 9, 10-dimethyl-1, 2-benzanthracene with sodium bi-nromate was also tested. Irradiation reduced the carcinogenic potency of these hydrocarbons. 'o correlation was found between depression in absorption intensity and carcinogenic potency. he types of tumors produced, their frequency and a possible explanation of action of irradiation are resented. *Subject Headings:* **1. Carcinogenesis 2. Photosensitization 3. UV radiation effects.**

4H–135 551.521.9:551.586:616

Figge, F. H. J., **Cosmic radiation and cancer.** *Science*, 105:323–325, March 29, **1947.** table, refs. **DLC**—Attempt was made to intensify the rate of cosmic radiation by various combinations f lead plates and to compare the rate of carcinogenesis in mice exposed to intensified cosmic radiation ith those exposed to normal cosmic radiation. Hundred and eighty-four C3H mice were injected ith methylcholanthrene and divided into 8 groups. Tumors in controls, no lead shielding being sed, developed more slowly than in mice covered with lead plate. The 50% latent period was 9.6 eeks for the controls and 6.7 for experimental animals. Induction of tumors was increased with mount of lead shielding, indicating increased ionizing radiation as cosmic rays pass through lead lates. A possible hypothesis for carcinogenesis is suggested and its implication to cancer prevention discussed. *Subject Headings:* **1. Carcinogenesis 2. Cosmic radiation.**

4H–136 551.521.63:612 551.521.61:612 551.586:612

Helmke, Roderich, **Über die Herabsetzung oder Steigerung der Ultraviolett-Empfindlichkeit der enschlichen Haut bei gleichzeitiger Rot- und Infrarotbestrahlung. III. Mitteilung. Prüfung n der Latenzzeit.** [Reduction or increase of UV sensitivity of the human skin during simultaneous adiation with red and infrared rays. III. Testing of latency period.] *Strahlentherapie*, Berlin, 7(2):311–313, **1947.** table, 5 refs. **DSG**—On 132 individuals the latency period for the appearance

of erythema was studied under conditions of irradiation with UV and infrared rays, and UV and red light radiation. The sources of radiation were Jesionek therapy lamp for UV, Sollux lamp for infrared rays and Novolux lamp for cold red light. It was found that infrared shortens latency period and red light lengthens it. *Subject Headings:* **1. Erythema formation 2. Erythema latency period 3. Synergistic action 4. UV sensitivity.**

4H–137 551.521.63:612

Helmke, Roderich and Reise, Gertraude, **Über die Beeinflussung der Empfindlichkeit der menschlichen Haut gegen Bestrahlung mit langwelligem Ultraviolett durch gleichzeitige Infrarotbestrahlung.** [Influencing the sensitivity of the human skin toward radiation with long wave UV by simultaneous infrared irradiation.] *Strahlentherapie*, Berlin, 77(3):477–482, **1947.** fig., table, ref. **DSG**—On 150 individuals the authors studied the effect of supplements of infrared radiation to long wave UV radiation upon direct pigmentation. The Jesionek Hallen lamp with light filtered through Schott filter WG 111 and BG 111 was the source of UV light, heating lamp and Sollux lamp were the sources of infrared rays. In most individuals addition of infrared radiation reduced the threshold value of direct pigmentation and raised the degree of tanning, a pseudo synergistic effect. A small number of individuals exhibited a contrary behavior. *Subject Headings:* **1. Long UV radiation 2. Infrared radiation 3. Pigmentation 4. Synergistic action.**

4H–138 551.521.11:612 551.521.63:612 551.521.61:551.586:612

Schreiber, H., **Die Wellenabhängigkeit des lichtbiologischen Effektes.** [The dependence of the photobiological effect upon wave length.] *Strahlentherapie*, Berlin, 77(2):243–258, **1947.** 6 figs., table, 27 refs. **DSG**—The author discusses briefly the experimental difficulties encountered in investigating the influence of wave lengths upon biological objects in particular the effect of UV radiation upon the human skin. In a table he summarizes the existing reliable evidence on the effect of wave lengths upon biological organisms, both plant and animal, including man. *Subject Headings:* **1. Short UV radiation 2. Long UV radiation.**

4H–139 551.521.9:612 551.521.63:551.586:612 551.521.11:612

Schultze, Rudolf, **Die biologischen wirksamen Komponente des Strahlungsklimas.** [Biologically effective components of the radiation climate.] *Naturwissenschaften*, 34(8):238–246, **1947.** 11 figs., 2 tables, 21 refs. **DSG**—A comprehensive and concise survey of the radiation climate that influences living matter. The author discusses the types of radiation present on the earth's surface including matter radiation and field radiation, the physical properties of these types of radiation, radiation intensities of the various types of radiation at the earth's surface, the biological action, corpuscular radiation, cosmic radiation, γ-radiation and X-rays, high frequency radiation, UV, visible light and infrared anabolic and catabolic aspects of radiation, possible mode of action of radiation and utilization of radiation by the human body. *Subject Headings:* **1. Photobiological effects 2. Cosmic radiation 3. Visible radiation 4. UV radiation 5. Infrared radiation.**

1948

4H–140 551.521.11:551.586:616

†Blum, Harold F., **Sunlight as a causal factor in cancer of the skin.** *National Cancer Institute, Washington, D. C., Journal*, 9(3):247–258, Dec. **1948.** 4 figs., 39 refs. **DSG**—A critical review of experimental studies dealing with the relationship between cancer and UV radiation carried out between 1940 and 1947 and their bearing upon the problem of human cutaneous cancer. The aspects of the problem discussed are: the evidence which demonstrates that the carcinogenetic wave lengths are shorter than 3200 Å, the external relationships between carcinogenesis and other destructive effects of sunlight, a comparison of the cutaneous tumors induced in mice by UV radiation and in man by sunlight. The topographic distribution and time of appearance of tumors in mice and in man, the incidence of cutaneous tumors as related to latitude and to the ozone content of the atmosphere, immunity to cutaneous tumors and possible prophylactic measures. *Subject Headings:* **1. Carcinogenesis 2. Cancer immunity 3. Solar radiation effects 4. Skin cancer.**

4H–141 551.521.11:551.586:616

Friedrich, W., **Licht als Kanzerogenes Agens.** [Light as a carcinogenic agent.] *Medizinische Klinik*, Berlin, 43(17):496, Sept. **1948.** **DSG**—Monochromatic rays with a wave length of 2970 Å produce in the skin of white mice severe erythemas with subsequent proliferative and regenerative processes, finally resulting in cancer. The minimum dose amounts to 2.0×10^7 erg/cm². Wave length 3130 Å leads to similar changes, but cancer has not occurred so far; 2537 Å rays resulted only in erythema without any cancer formation. *Subject Headings:* **1. Carcinogenesis 2. Erythema formation 3. Long UV radiation 4. Short UV radiation.**

4H–142 551.586:551.521.63:636

Kaiser, M., **Über den Einfluss künstlicher und natürlicher UV-Strahlen im Tierversuch.** [The influence of artificial and natural UV rays in animal experiments.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* 1(1):93–101, **1948.** 4 refs. German, English and French summaries p. 93–94. **MH-BH**—To find whether UV radiation is harmful in smallpox cases, vaccinated rabbits were exposed to a quartz lamp and also to natural radiation at a height of 2,022 m. In both cases the development of the rash was clearly retarded compared with the control. Hence, exposure to radiation is helpful rather than harmful. (*Same item as* 5–96, May 1950, *MAB.*) *Subject Headings:* **1. Smallpox vaccination 2. UV radiation effects.**—*C.E.P.B.*

4H–143 551.586:612.014.43

Lloyd-Smith, D. L. and Mendelssohn, K., **Tolerance limits to radiant heat.** *British Medical Journal,* No. 1:975–978, May 22, **1948.** 4 figs., 10 refs. **DSG**—The tolerance limit to local irradiation by visible and infrared rays was measured in terms of radiative flux and skin temperature on 40 subjects by exposing areas of skin to radiation from a 1000 watt tungsten filament bulb set in a concave reflector. There is a well marked transition from a feeling of heat which is comfortable to a sensation of burning. "The skin temperature at which this change of sensation takes place is about 45°C (113°F) and the tolerated radiation is of the order of 2.5 gramme-calories per square centimeter per minute." *Subject Headings:* **1. Skin 2. Heat tolerance 3. Visible radiation 4. Infrared radiation.**

4H–144 551.521.64:551.586:616

Morris, P. A. and Nickerson, W. J., **Cosmic radiation and cancer mortality.** *Experientia,* Basel, 4(7):251–255, July 15, **1948.** 15 figs., 19 refs. **DWB**—A critical examination of statistical evidence for the existence of a correlation between total intensity of cosmic radiation and cancer mortality. Intensity of cosmic radiation increases with geomagnetic and geographic latitude and with altitude, total cancer mortality increases with geographic latitude with degree of urbanization and apparently with altitude in the case of Switzerland. The primary radiation from cosmic rays is probably not different by an order of magnitude from the radiation received from natural sources to which the body is exposed. However, cosmic ray showers producing properties of ceilings, etc. might increase amount of radiation received by persons spending much time indoors. Skin cancer mortality increases with decrease in latitude but mortality from breast cancer, uterus cancer and liver biliary passage cancer show no relationship with latitude. The role of complicating clinical and racial factors in determining cancer incidence is discussed. *Subject Headings:* **1. Carcinogenesis 2. Skin cancer 3. Breast cancer 4. Uterine cancer 5. Liver cancer 6. Cosmic ray effects.**

1949

4H–145 551.521.1:551.521.63

Coblentz, W. W., **Correlation of bioclimatic ultraviolet and total solar radiation in Washington, D. C., 1941–1948.** *American Meteorological Society, Bulletin,* 30(6):204–207, **1949.** fig., table, 16 refs. **MH-BH**—An analysis is made of all the data available on extraterrestrial UV radiation and the amount reaching the earth's surface. No modification of the methods of estimating the biologically effective component is required. The ratio of daily amount of incident UV in Washington (2900–3150 Å) to total solar and sky radiation varies from .019 in Dec. to .069 in July. (*Same item as* 2.5–97, May 1951, *MAB.*) *Subject Headings:* **1. UV radiation 2. Diurnal UV radiation variations 3. Washington, D. C.**—*C.E.P.B.*

4H–146 551.521.11:551.586:612:616

Friedrich, W., **Krebserregende Eigenschaft des Lichtes.** [Carcinogenic properties of light.] *Medizinische Klinik,* Berlin, 44(3):89, Jan. 21, **1949.** **DSG**—"In experience with monochromatic UV irradiation the author found that an application of the maximum of the erythema curve (2970 Å) to white mice gave rise to inflammatory proliferation and regenerative processes and ultimately lead regularly to the formation of cancer. Irradiation for 3 months with a wave length of 2537 Å causes inflammation and proliferation phenomena, but no carcinoma. On the other hand UV rays exceeding the maximum of the erythema curve (3341 Å) are not apt to produce cancer. In the formation of cancer in these experiments the selectivity of the UV radiation is a determining factor." *Subject Headings:* **1. Carcinogenesis 2. Erythema curve 3. Short UV radiation.**

4H–147 551.506:551.521.64:612:616

†Hess, Victor F. and Eugster, Jakob, **Cosmic radiation and its biological effects.** 2nd ed. New York, Fordham University Press, **1949.** 178 p. **DLC**—Pt. 1, by Victor F. Hess, is concerned with the physics of cosmic radiation. Pt. 2, by Jakob Eugster "The biological effects of cosmic radiation," contains a review of the literature on this problem and of a report of experiments carried

out by the author to determine the action of cosmic radiation upon living matter. The literature survey and the experiments cover: effects of cosmic radiation upon unicellular organisms (bacteria), plants, *Drosophila melanogaster*, rabbits and mice, etc. *Subject Headings:* **1. Carcinogenesis 2. Cosmic ray effects.**

4H–148 551.521.11:551.586:616 551.521.63:61

†Maisin, J., **Cancer. v. 1, Hérédité, hormones, substances cancérigènes. v. 2, Radiations virus, environment.** [Cancer. v. 1, Heredity, hormones, carcinogenic substances. v. 2, Radiations, virus, environment.] Tournai-Paris, Casterman, **1949. DSG**—Vol. 2 contains a review and discussion of some of the clinical and experimental studies on the production of cancer by infrared light and UV radiation and of the role of atmospheric temperature in the etiology and development of cancer. The bibliography is good. *Subject Headings:* **1. Carcinogenesis 2. UV radiation 3. Infrared radiation.**

4H–149 551.586:551.521.63

Schultze, Rudolf, **Über die Bewertung der mittelwelligen Ultraviolettstrahlung in der Bioklimatologie.** [On the value of the middle wave length UV radiation in bioclimatology.] *Wetter und Klima*, 2(5/6):144–150, May/June **1949.** 2 figs., 2 tables. **DWB**—Author summarizes briefly suspected effects of different wave lengths and considers that too much attention is given to UV radiation and too little to high-frequency radiation from fronts, long wave UV and visible radiation. Experiments on increase of threshold value of UV for erythema with gradual exposure to UV are described. (*Same item as* 5–98, May 1950, *MAB.*) *Subject Headings:* **1. Erythema formation 2. Long UV radiation 3. Visible radiation.**—*C.E.P.B.*

1950

4H–150 661.521.61:612 551.521.11:612:016 551.521.63:612

†Blum, Harold F., **Radiation: Non-ionizing: Photophysiology and photopathology.** (In: Glasser, Otto (*ed.*), **Medical physics.** v. 2. Chicago, Ill., The Year Book Publishing Co., **1950.** p. 753–766.) **DLC**—A comprehensive review of the biologic phenomena produced by UV, visible and infrared radiation within the approximate wave lengths limits 20,000 to 15,000 Å, a spectral region that brings about photochemical reactions. The physical mechanism underlying photochemical reactions is summarized quantitatively. This is followed by a discussion of the penetration of radiation into the human skin, the effect of wave lengths shorter than 3200 Å, the nature of photodynamic action and its role in photobiologic processes, the responses of normal skin to radiation less than 3200 Å by means of sunburn, erythema and suntan, erythemal threshold, protection against sunburn, systemic effects associated with sunburn, the antirachitic action of sunlight, diseases caused by light including photosensitivity to wave lengths longer and shorter than 3200 Å, photosensitization by porphyrins, disease of the eye produced by light (photophthalmia, eclipse blindness, retinal changes, photophobia), and artificial photosensitization to wave lengths shorter than 3200 Å, produced by sulfanilimide and to wave lengths greater than 3200 Å by photodynamic dyes, lipstick, coal tar and its derivatives and by plants and plant substances. A very extensive bibliography is appended. *Subject Headings:* **1. Photosensitivity 2. Erythema formation 3. Short UV radiation 4. UV radiation penetration 5. Photopathological effects.**

4H–151 551.521.63:551.586:612

Burckhardt, W. and Künzli, R., **Der Einfluss von Nässe und Kälte auf das Ultraviolett-Erythem.** [Influence of moisture and cold on UV erythema.] *Dermatologica*, 101:213–216, **1950. DSG**—Cooling of the skin prior to exposure to UV radiation from a Dronmayer quartz lamp postponed the appearance of light erythema by a few minutes to two hours; but the intensity and threshold of the erythema remained unaltered. On wet skin, however, UV radiation produces a stronger erythema, the threshold is lower and the latency period is shorter. The increase in the latency period is explained by the fact that the wet horny layer of the skin is less permeable to UV rays than when it is dry. *Subject Headings:* **1. Erythema formation 2. Erythema latency period 3. Skin condition 4. UV radiation.**

4H–152 551.521.63:551.586:616

Heller, W., **Experimentelle Untersuchungen über den Lichtkrebs. Einfluss der Wellenlänge des Lichtes auf die Entstehung des Lichtkrebses bei der weissen Maus.** [Experimental investigations of light cancer; effect of wave length upon the development of light cancer of the white mouse.] *Strahlentherapie*, Berlin, 81(3):387–410, **1950. DSG**—Literature on the production of cancer by sunlight and UV radiation reviewed critically. In an experimental study on 141 white mice, cancer

was induced by medium length UV radiation 2850–3390 Å as well as by short wave 2800–2380 Å. *Subject Headings:* **1. Carcinogenesis 2. Long UV radiation 3. Short UV radiation.**

4H–153 551.521.63:551.586:616

Heller, W., **Experimentalle Untersuchungen über den Lichtkrebs; 2. Mitteilung. Lichtkrebs Erzeugung durch Photosensibilisierung.** [Experimental investigation of photogenous cancer; carcinogenic photosensitization.] *Strahlentherapie*, Berlin, 81(4):537–548, **1950.** 13 figs., numerous refs. **DSG**—The literature on production of cancer by light with the aid of photosensitilizing substances is reviewed critically. Eighty-seven white mice were painted with anthracene. One group was irradiated with UV radiation of 4050–3200 Å and the other with long wave above 3200 Å UV radiation plus sunlight. Malignant cutaneous tumors were produced by long wave non-carcinogenic UV radiation after photosensitization. *Subject Headings:* **1. Long UV radiation 2. Solar radiation effects 3. Carcinogenesis.**

4H–154 551.586:551.521.11:615.8

Laurens, Henry, **Heliotherapy: Measurement and application of solar rays.** (In: Glasser, Otto (*ed.*), **Medical physics.** Chicago, Ill., The Year Book Publ. Co., **1950.** p. 591–597.) **DLC**—Solar radiation exerts its therapeutic action in combination with other atmospheric and environmental factors such as fresh air, wind, diet, etc. This review contains a qualitative discussion of the physical properties of solar radiation including: 1) the solar spectrum, variations in solar energy caused by long and short period fluctuations, 2) variations in the intensity of solar radiation, in particular of the UV and infrared radiation received at the earth's surface, 3) the quantity and quality of solar radiation as determined by such atmospheric constituents as ozone, water vapor and dust, altitude above sea level, geographic latitude and cloudiness, 4) variations of wave lengths with time of day and with season, and 5) the radiational characteristics of the northern skylight. The selective and non-selective techniques for measuring solar radiation, instruments for measuring erythemal effectiveness, the effectiveness of long and short wave UV in producing erythema and UV dosages in therapeutics are considered. *Subject Headings:* **1. Erythema formation 2. Therapeutic action 3. Solar radiation 4. Long UV radiation 5. Short UV radiation 6. UV dosimetry.**

4H–155 551.521.63:551.586:612

Lehmann, Gunther, **Der Einfluss der Ultraviolettbestrahlung auf Arbeitsstoffwechsel und Arbeitsfähigkeit.** [Influence of UV radiation upon working metabolism and working capacity.] *Strahlentherapie*, Berlin, 83:109–117, **1950. DSG**—The effect of UV radiation is classified in 4 stages: 1) behavior of the organism during radiation, 2) immediate post radiation effects, 3) erythema effect, and 4) late or permanent effect. Stage 4 is particularly relevant to the effect of UV upon working capacity. Various studies are summarized. Basal metabolism declines during radiation, rises during erythema and falls again in stage 4. Studies showing that working capacity increases during continuous radiation are cited. The resemblance of late UV effects to training effects is discussed. Comments on the papers by RAJEWSKY and LEHMANN are appended. *Subject Headings:* **1. Metabolism 2. Working capacity 3. Erythema formation 4. UV radiation effects.**

4H–156 551.521.63:612 551.508.25:551.521.63 551.586:551.521.63

Pfleiderer, H., **Ultraviolettstrahlung in der Bioklimatologie.** [UV radiation in bioclimatology.] *Strahlentherapie*, Berlin, 83(1):118–136, **1950.** 25 refs. **DSG**—A critical account of the present status of the field of UV bioclimatology. Interest in the bioclimatic role of UV radiation has declined recently owing to the appearance of fashionable and vague notions of the meteoropathological influences of Aran and of atmospheric potential gradients, the too optimistic claims made for the therapeutic and beneficial effects of UV rays and the technical difficulties encountered in measuring the therapeutically effective UV spectral regions. The author then considers the biological action of UV radiation under natural conditions and of artificially produced UV radiation; effect of atmosphere upon UV radiation, the photochemical measurement of UV radiation and the inadequacy of the erythema dose as a measure of biological effectiveness of UV radiation. The dependence of UV radiation upon meteorological and climatic conditions, its geographical distribution, its vertical distribution in the atmosphere and its use in heliotherapy are discussed. *Subject Headings:* **1. UV dosimetry 2. Therapeutic action 3. Erythema formation 4. UV radiation distribution.**

4H–157 551.521.63:551.586:612

Rajewsky, B., **Aktuelle Fragen der Ultraviolett-Forschung.** [Actual problems of ultraviolet research.] *Strahlentherapie*, Berlin, 83:104–108, **1950. DSG**—Concise summary of the history of the development of knowledge on the medical-biological effects of UV radiation. The author criticizes the lack of precise knowledge on the therapeutic application of UV radiation, on dosimetry and on its biological-medical effects. Article deals largely with conditions in Germany. *Subject*

Headings: **1. Photobiological effects 2. Therapeutic action 3. UV dosimetry 4. History of ultraviolet radiation research.**

4H–158 551.521.64:551.586:612

Schaefer, Hermann J., **Evaluation of present-day knowledge of cosmic radiation at extreme altitude in terms of the hazard to health.** *Journal of Aviation Medicine*, New Orleans, 21(6):375–394, 418, 1950. 4 figs., 4 tables, 11 refs. **DSG**—The author discusses present knowledge of cosmic radiation including the origin, energies and other physical properties of primary radiation, the interaction of the primaries with the air blanket and the mechanism of shower production, the evaluation of the physical properties of cosmic radiation for the health hazard and the conversion of numerical data on the intensities of the various components of cosmic radiation into biological dosage units—namely the total ionization and the heavy nuclei rays. *Subject Headings:* **1. Cosmic radiation 2. Photobiological effects.**

4H–159 551.521.11:551.586:612

Snapp, Robert H., Niderman, Dorothy J. and Rothman, Stephen, **Experiments on the theory of photochemical formation of carcinogens from skin spots.** *Cancer Research*, 10(2):73–76, Feb. 1950. table, 26 refs. **DSG** The literature on the possibility of the formation of carcinogens from sterols present in skin fat under the action of UV radiation is reviewed. The ears of 50 female albino white mice were painted with the irradiation products of skin surface fats, including digitonin precipitable sterols, isocholestrols and total unsaponifable fractions for periods from 15 to 18 months. No histologically identifiable precancerous or cancerous changes were produced. The theory that carcinogenous compounds are formed on the skin under photochemical action could not be substantiated. *Subject Headings:* **1. Carcinogenesis 2. Photochemical effects.**

1951

4H–160 551.586:551.521.64:612

†Krebs, A. J., **Possibility of biological effects of cosmic rays in high altitudes.** *Journal of Aviation Medicine*, 21(6):481–494, 1951. 3 figs., 4 tables, 75 refs. **DSG**—In this review of the physics and biological effects of cosmic rays, the author considers: heavy nuclei in the primary component of cosmic radiation, cosmic ray stars including the exploding and evaporating stars and nature of the star exciting radiation; mesons; origin of cosmic rays, and the biological effects of cosmic rays as manifested by mutations and carcinogenesis. *Subject Headings:* **1. Photobiological effects 2. Cosmic ray properties 3. Carcinogenesis.**

4H–161 551.521.63:551.586:612:616

Thomson, M. L., **Dishydrosis produced by general and regional ultra-violet radiation in man.** *Journal of Physiology*, London, 112(1/2):22–30, 1951. 3 figs., table, 8 refs. **DSG**—In a hot, humid climate general UV radiation, administered from a quartz mercury vapor lamp with sufficient intensity to produce a third-stage erythema, reduced the sweating rate of seven individuals, acclimatized to heat but not to radiation, by 60% on the second and third day after exposure. In individuals irradiated in a hot, dry environment with high air movement, similar irradiation produced no change in overall sweating rate. A renewed exposure to UV radiation after recovery from dishydrosis caused by one exposure reduced further the sweating rate in the same person. The wave lengths of the radiation causing the reduced sweating are probably greater than 2950 Å and hence are present in sunlight. *Subject Headings:* **1. Erythema formation 2. Sweating 3. Dishydrosis 4. UV radiation effects.**

1952

4H–162 551.586:612.12:551.521.64

Buettner, Konrad, J. K., (*U.S.A.F. School of Aviation Medicine, Randolph Field, Texas*), **Biological effects of radiation of possible extraterrestrial origin.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 544–547. 11 refs.) **DLC**—A brief description of the "Takata" test which involves the determination of the amount of mercuric chloride required to produce the first visible flocculation in blood serum, and its use in the field of "astro-biophysics" for detecting the Takata reaction, which is postulated by Takata to be produced by the action of neutrinos or neutrinettos upon the blood. Various attempts to confirm this reaction are reviewed; all proved negative. Studies of Düll to correlate sunspots and death rate, and those of Bortels to correlate growth rate of bacteria with weather etc., are mentioned. *Subject Headings:* **1. Blood 2. Cosmic ray effects 3. Takata reaction.**

4H–163 551.521.64:551.510.53:612

Evans, Titus Carr (*Iowa State Univ.*), **A discussion of the potential effects on man of ionizing radiation present in the upper atmosphere.** (In: U. S. School of Aviation Medicine, Randolph

Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 533–539. 3 tables, 25 refs.) **DLC**—The character of the cosmic radiation in the upper atmosphere which consists predominately of protons is such that the biologic effect per roentgen equivalent is more than two to 10 times greater than X-rays, gamma rays or beta particles. Evidence showing that protons, neutrons and other heavily ionizing particles in spite of their small amount are biologically effective in chronic and multiple daily exposures, is reviewed. Tables giving data on mean survival and mean accumulation dose for mice, equivalence of neutrons and X-rays in mice, etc., are included. *Subject Headings:* **1. Cosmic radiation 2. Photobiological effects.**

4H–164 551.521.64:551.594.12:612

†Schaefer, Hermann J. (*Naval Air Station, Pensacola, Fla.*), **The biologic effects of cosmic radiation.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 290–315. 7 figs., 3 tables, 26 refs.) **DLC**—An extensive review of the ionization characteristics of heavy nuclei and that of ordinary types of ionizing particles with particular reference to the spatial distribution of the primary ionization in the microscopic structure of biological tissues, radiation effects upon germ and somatic cells, a consideration of the effects produced by comparative ionization dosages from internal radium and from primary cosmic radiation, and of the properties and biological effects of disintegration stars and air showers. Photographs and diagrams and an extensive bibliography are included. *Subject Headings:* **1. Cosmic radiation 2. Ionization 3. Photobiological effects.**

4H–165 551.586:551.521.64:612:616

Schaeffer, Hermann J., **Exposure hazards from cosmic radiation beyond the stratosphere and free space.** *Journal of Aviation Medicine,* 23(4):334–344, 401, **1952.** 7 figs., 16 refs. **DSG**—The ionization dosage from cosmic radiation increases from a sea level value of 0.1 milliroentgen-equivalent-physical per 24 hours to a maximum of 15 mrep/d at 75,000 ft at lat. 58°N. It then decreases and levels off to 9 mrep/d at 140,000 ft. The actual ionization dosage in airplanes or rocket ships is considerably higher owing to transition effects. The principle exposure hazard in the outer regions is provided by the heavy nuclei component due to the extremely high specific ionization of these particles. The so-called then-down part and the ionization peak of the low energy particles are most harmful. Heavy nuclei are characterized by a large radial spread in the ionization peak and then-down part of a nucleus $Z=20$. A human organism exposed to the full heavy nuclei intensity will receive about 100 hits of 15,000 cells per heavy nucleus hit. *Subject Headings:* **1. Cosmic ray distribution 2. Photobiological effects 3. Aviation medicine.**

4H–166 551.510.536:612.275.11

†Strughold, Hubertus (*U.S.A.F. School of Aviation Medicine, Randolph Field, Texas*), **Basic environmental problems relating man and the highest regions of the atmosphere as seen by the biologist.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 23–24. 5 figs., 32 refs.) **DLC**—With increasing altitude above sea level the environment displays characteristic ecological stages which depend upon the diminishing O_2 pressure and upon electromagnetic and corpuscular ionizing radiation. The psychophysiological effects produced on man by diminishing O_2 pressure in the hypoxic zone and in the zone of anoxia, survival and revival time and their relationship to the constitution of alveolar air, the necessary properties of artificial air at high altitudes, and the distribution of cosmic and ultraviolet radiation at high altitudes are discussed briefly. *Subject Headings:* **1. Aviation medicine 2. Exosphere.**

4H–167 551.586:551.521.9:612:616

†Tobias, Cornelius A., **Radiation hazards in high altitude aviation.** *Journal of Aviation Medicine,* New Orleans, 23(4):345–372, Aug. **1952.** 11 figs., 7 tables, 70 refs. **DSG**—The potential hazard that might be expected from cosmic radiation at high altitude is discussed with reference to dosimetry and the expected biological effects. The contents of this comprehensive review are: probable duration of exposure; distribution of different types of radiations in the cosmic radiation; cosmic rays between 0 and 70,000 ft altitude; neutrons in the atmosphere; ionization from cosmic ray nuclei; energy transfer from cosmic ray nuclei; estimation of distribution of the dose in the heavy nuclei of cosmic rays; rate of energy loss; biological effects of cosmic radiation components with rate of energy loss below 10^8 erg^{-1} cm^2; lethal effect on single cells; lethal effects on animals and effects on tissues; estimates of the relative biological effects of highly ionizing particles; biological effects at a distance from highly ionizing nuclei; amount of destruction along tracks of heavy nuclei; effects of repeated radiation upon longevity; carcinogenesis and leukemia; radiation effects upon fertility; effects upon the germ plasm; physiological effects of low level radiation; cosmic ray effects on nerve and brain tissue, and radiation cataracts. *Subject Headings:* **1. Photobiological effects 2. Carcinogenesis 3. Reproductive system 4. Nervous system 5. Aviation medicine.**

4H–168 551.521.61:551.586:615.8:01

†U. S. Library of Congress. Technical Information Div., **Infrared in relation to skin and underlying tissue.** Washington, D. C., April **1952.** 20 p. **DLC** This bibliography includes reference to literature published during the period from 1935 to 1951, relating to the infrared optical properties of skin and underlying tissue, the physiological and pathological effects of infrared radiation and the use of infrared in diagnosis and therapy involving these areas. Material relating to blood, deep lying tissues and internal organs has been excluded. The bibliography is not annotated. *Subject Headings:* **1. Infrared radiation bibliographies 2. Infrared radiation effects.**

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4H–169 551.521.63:551.586 551.508.25:551.521.6

†Lossen, Heinz, **Zur Anwendung der UV-Strahlung in der ärztlichen Praxis.** [On the use of UV radiation in medical practice.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte,* No. 8:107–116, **1953.** table, 25 refs. Seitz, E. O., **Technische Anwendung ultravioletter Strahlen.** [Technical use of UV radiation.] *Ibid.,* p. 116–120. fig. Dannmeyer, F., **Ultraviolette Himmels- und Sonnenstrahlung in nordischen Breiten (Expeditionserfahrungen und Folgerungen).** [UV sky and sun radiation in northern latitudes. (Expedition experiences and results.)] *Ibid.,* p. 120–126. 5 figs., refs. **DWB**—1. Lossen summarizes history of therapeutic and prophylactic use of UV and Röntgen rays since 1923. Effects and treatment are described including UV treatment of room air, antirachitic milk, etc. 2. Seitz discusses physics, sources and biological effects of UV radiation of different wave lengths. 3. Dannmeyer describes researches on Dorno radiation and cadmium cells in different parts of the world, especially Iceland compared with Hamburg. Bellani's spherical pyranometer is illustrated and advantages of M. Bender's modification (quartz sphere with acetone) described. *Subject Headings:* **1. UV radiation 2. UV dosimetry 3. Photobiological effects. I. Seitz, E. O. II. Dannmeyer, F.**—*C.E.P.B.*

4H–170 551.521.9:551.586:612

Schönicke, Ernst-August, **Welche Funktionen des Organismus werden durch die UV-Erythemschwelle erfasst?** [What functions of the organism are involved in the UV erythema threshold?] *Strahlentherapie,* Berlin, 89(3):469–480, **1953.** fig., ref. **DSG**—The principal studies on the erythemal threshold of normal individuals and patients suffering from various types of illnesses are reviewed. Using a Hanovia quartz lamp, the author studied on 300 patients of the tumor clinic of German Academy of Sciences at Berlin the dependence of erythemal threshold upon the specific state of excitation of the vegetative nervous system. The sympathetic-parasympathetic system influences both the erythema and its intensity in that higher excitation of the vegetative nervous system is associated with hypersensitivity to light. Evidence is presented indicating that cachetic individuals are more sensitive to UV rays than well nourished persons. The author concludes that light erythema does not characterize the general resistance of the entire organism but rather the conditions of the individual vegetative nervous system. *Subject Headings:* **1. Erythema formation 2. UV sensitivity 3. Vegetative nervous system.**

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

American Geophysical Union, Transactions, Volume 34, Number 2, April 1953.

Gutenberg, B.: **Microseisms, microbaroms, storms, and waves in western North America,** p. 161–173.

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Wait, James R.: **Induction by a horizontal oscillating magnetic dipole over a conducting homogeneous earth,** p. 185–188.

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Vetter, C. P.: **Sediment problems in Lake Mead and downstream on the Colorado River,** p. 249–256.

Schiff, Leonard: **The effect of surface head on infiltration rates based on the performance of ring infiltrometers and ponds,** p. 257–266.

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Hurwitz, L.: **Reduction of airborne magnetometer results,** p. 360–362.

Schonstedt, E. O. and Irons, H. R.: **Airborne magnetometer for determining all magnetic components,** p. 383–378.

Warnick, C. C.: **Experiments with windshields for precipitation gages. Discussion by Walter T. Wilson,** p. 379–388.

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Gleason, Clark H.: **Indicators of erosion on watershed land in California,** p. 419–426.

Riggs, H. C.: **A method of forecasting low flow of streams,** p. 427–434.

Aldrich, L. T., Herzog, L. F., Doak, J. B. and Davis, G. L.: **Variations in strontium isotope abundances in minerals. Part 1: Mass spectrometric analysis of mineral sources of strontium,** p. 457–460.

Herzog, L. F., Aldrich, L. T., Holyk, W. K., Whiting, F. B. and Ahrens, L. H.: **Variations in strontium isotope abundances in minerals. Part 2: Radiogenic Sr^{87} in biotite, feldspar, and celestite,** p. 461–470.

Donn, William: **A comparison of microseisms and ocean waves recorded in southern New England,** p. 471–476.

Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen, 1951/1952.

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Lossnitzer, H.: **Arbeiten des Landeswetterdienstes zur Frage der Wasserwirtschaft und Landeskultur in Südbaden,** [Works on the Landeswetterdienst on hydrology and agriculture in south Baden], p. 26–32.

Aichele, H.: **Stau- und Leewirkungen in der Baar.—Kleinklimatische Niederschlagsstudien,** [Upslope and lee effects in the Baar. Local climatic precipitation studies], p. 33–38.

Aichele, H.: **Kambialtemperaturen am Baumstamm im Jahresablauf,** [Cambial temperatures of the tree trunks in the course of the year], p. 39–44.

Bähr, W.: **Erhaltungsneigung des Niederschlages und Bauernwetterregeln,** [Persistence of precipitation and weather lore], p. 45–54.

Busse, W.: **Das Klima des südlichen Schwarzwaldes und der Baar. 2. Teil,** [The climate of the southern Black Forest and of the Baar, Pt. 2], p. 55–82.

Gasser, O.: **Regeneration und Degeneration von Kaltfronten,** [Regeneration and degeneration of cold fronts], p. 83–92.

Hebner, E. and Trenkle, H.: **Hochwasser in Baden im Jahre 1935,** [Floods in Baden in 1935], p. 93–120.

Herbst, W.: **Zur Frage der Ablösbarkeit des Blütenstaubes einiger Wind- und Insektenblütler bei verschiedenen Windgeschwindigkeiten,** [The detachability of pollen of wind and insect pollinated flowers at different wind speeds], p. 121–123.

Herzog, F.: **Bodenfeuchtmessung durch Wärmeleitfähigkeitsbestimmungen,** [Soil moisture measurements through heat conductivity determination], p. 124–128.

Lessman, H.: **Ein Beitrag zum Sonderklima der unteren Schwarzwaldtäler,** [A contribution to the local climate of the lower Black Forest valleys], p. 129–133.

Lessmann, H.: **Über Temperatursummen,** [Cumulative temperatures], p. 134–143.

Lessmann, H.: **Phänologie und Witterung in den Jahren 1947 bis 1951 in der südlichen Oberrheinebene,** [Phenology and weather conditions in 1947–1951 in the southern Upper Rhine Plateau], p. 144–151.

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Neuwirth, R.: **Über Messungen des bodennahen Ozons in Südwestdeutschland,** [Measurements of ozone near the ground in SW Germany], p. 155–168.

Rudloff, H.: **Winterstrenge und Sommerwärme in Südwestdeutschland,** [Winter cold and summer heat in SW Germany], p. 169–172.

Trenkle, H. and Rudloff, H.: **Monatliche und jährliche Mittelwerte von Niederschlag und Temperatur (1871–1950) für das südliche Baden,** [Monthly and annual mean precipitation and temperature (1871–1950) for southern Baden], p. 173–184.

Trenkle, H.: **Eine langperiodische Klimaschwankung um die Jahreswende in Karlsruhe,** [A long period climatic variation near the turn of the year in Karlsruhe], p. 185–192.

Waibel, K.: **Vergleichsmessungen von Temperatur und Feuchte am Observatorium Feldberg/Schwarzwald,** [Comparative measurements of temperature and humidity at the Feldberg/Schwarzwald Observatory], p. 193–204.

Schaller, E.: **Die Witterung im Jahre 1951 (Land Baden),** [The weather in 1951 (Baden)], p. 205–211.

Beiträge zur Geophysik, Leipzig, Volume 63, Number 2, 1953.

Cadez, Marjan: **Über die Strömung der inneren und der kinetischen Energie in der Atmosphäre,** [On the flow of internal and kinetic energy in the atmosphere], p. 130–144.

Karapiperis, Leon N.: **The moon and the thunderstorms,** p. 145–148.

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Melchior, Paul J.: **Astronomia meridiana e geofisica,** [Meridian astronomy and geophysics], p. 29–32.

Aliverti, Giuseppina and Lovera, Giuseppe: **Sui nuclei di condesazione di origine marittima,** [Condensation nuclei of marine origin], p. 33–35.

Petrucci, Giuseppe: **Sulla prospezione geoelettrica diretta dell'acqua nell sottosuolo,** [Geoelectric prospecting of subterranean waters], p. 36–41.

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Bossolasco, Mario: **La microsismica come mezzo di prospezione del sottosuolo,** [Microseisms as a mean of underground prospecting], p. 55.

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1-K	**Report on meteorological aspects of artificial nucleation Phoenix Area in summer.** For: Arizona Weather Research Foundation.	July, 1948
2-K	**Report on meteorological aspects of artificial nucleation in San Diego Mountain area in summer.** For: Irrigation and Power interests.	July 1948
3-K	**Preliminary report on July operations of artificial nucleation in Phoenix area.** For: Arizona Weather Research Foundation.	August 1948
4-K	**Supplement No. 1 to report on meteorological aspects of artificial nucleation in the San Diego mountain area in summer.** For: Irrigation and Power Interests	Sept. 1948
8-K	**Report on artificial nucleation experiments in the Logo Toronto area of Mexico.** For: Cia Agricola y Fuerza-Electricia Del Rio Conchos, S. A.	Nov. 1948
10-K	**Evaluation of cloud seeding operations in the Phoenix area during the summer of 1948.** For: Arizona Weather Research Foundation.	Sept. 1949
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24	**Progress report on survey of sites in New Mexico suitable for the artificial stimulation of precipitation through cloud seeding in the Rio Grande Dramogi Basin.** For: New Mexico Development Commission, Santa Fe, N. M.	Feb. 3, 1950
27	**Evaluation of the results of aerial cloud seeding operations in the Necaxo region, Mexico, during the period June through October, 1949.** For: Compania Mexicana De Luz y Fuerza Moritz, S. A.	May 1, 1950
28	**Prospects for seeding in the Necaxa region with silver iodide generators located on the ground.** For: Compania Mexicana De Luz y Fuerza Motriz, S. A.	May 1, 1950
32	**Analysis of cloud seeding potentialities to increase natural precipitation in northeastern Colorado.** For: Southeast Weather Research Association.	July 15, 1950
33	**Analysis of cloud seeding potentialities to increase natural precipitation in Southeastern Colorado.** For: Southeast Weather Research Association.	June 29, 1950
35	**Analysis of cloud seeding potentialities to increase natural precipitation in northeastern Colorado.** For: Northeastern Colorado Water Development Corporation. Prepared for: Water Resources Development Corporation.	Aug. 1, 1950
36	**Analysis of cloud seeding potentialities in Camas Valley, Idaho.** For: Camas Weather Research Company. Prepared for: Water Resources Development Corporation.	Aug. 1, 1950
37	**Analysis of cloud seeding potentialities to increase natural precipitation in Santa Barbara County, California.** For: Santa Barbara County Water Agency. Prepared for: Water Resources Development Corp.	Sept. 20, 1950
38	**Analysis cloud seeding potential—Lewis River Ariel Dam Watershed, Washington.** For: Pacific Power & Light.	Aug. 20, 1950
39	**Analysis of cloud seeding potentialities to increase natural precipitation in Antelope Valley, California.** For: Antelope Valley Water Development Corporation.	Aug. 11, 1950
40	**Analysis of cloud seeding potentialities to increase natural precipitation in Morrow, Gilliam, and Sherman Counties (Oregon).** For: Tri-County Weather Research Corporation. Prepared for: Water Resources Development Corporation	Aug. 1, 1950
43	**Analysis of cloud seeding potentialities in Sunflower Valley (California) and adjacent areas.** For: Santa Clara County Survey. Prepared for: Water Resources Development Corporation.	Oct. 9, 1950

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45	**Analysis of cloud seeding potentialities in Big Bend Area of Washington.** For: Big Bend Water Development Corporation. Prepared for: Water Resources Development Corporation.	Nov. 24, 1950
44	**Analysis of cloud seeding potentialities in southeast Arizona.** For: Southeast Arizona Weather Research Corporation. Prepared for: Water Resources Development Corporation.	Oct. 15, 1953
46	**Analysis of cloud seeding potentialities in Santa Clara County (California).** For: Santa Clara County. Prepared for: Water Resources Development Corporation.	Jan. 24, 1951
47	**Analysis of cloud seeding potentialities in Black River Drainage Basin above Hatfield (Wisconsin).** For: Mississippi Valley Public Service Company. Prepared for: Water Resources Development Corporation.	Jan. 15, 1951
48	**Analysis of cloud seeding potentialities in plains of northeastern Colorado.** For: Northeastern Colorado Water Development Association. Prepared for: Water Resources Development Corporation.	Jan. 23, 1951
50	**Preliminary report cloud seeding potentialities Hebbronville Area, Texas.** For: Brooks-Jim Hogg Agricultural Development Association. Prepared for: Water Resources Development Corporation.	Apr. 28, 1951
51	**Some evaluations of sustained cloud seeding operations.** By Irving P. Krick and T. B. Smith. Presented at 32nd Annual Meeting of the American Geophysical Union at Washington, D. C., April 30, 1951.	Apr. 25, 1951
53	**Preliminary report of cloud seeding operations—Eastern Washington, June 1950.** For: Horrigan Farms.	June 29, 1950
54	**Preliminary reports (1, 2, 3) on the analysis of the cloud seeding potentialities of the upper south Platte Drainage Basin (Colorado).** For: Platte Valley Water Resources Association.	Nov. 2, 1950
56	**Report on cloud seeding operations for Camas Valley, Idaho (July, September, October, 1950).** For: Camas Weather Research Company. Prepared for: Water Resources Development Corporation.	Apr. 5, 1951
58	**Preliminary report cloud seeding potentialities Brule, Buffalo, Gerauld, Aurora Counties (South Dakota).** For: Western South Dakota Rain Increasing Corporation.	May 15, 1951
59	**Preliminary report cloud seeding potentialities in southern Utah.** For: Southern Utah Water Resources Development Corporation.	May 15, 1951
60	**Preliminary report cloud seeding potentialities in The Grand River Valley Area of North and South Dakota.** For: Grand River Valley Weather Improvement Association.	May 15, 1951
61	**Analysis of cloud seeding potentialities in Southwestern Colorado.** For: San Juan Weather Improvement Association. Prepared for: Water Resources Development Corporation.	May 31, 1951
62	**Analysis of cloud seeding potentialities in Laramie County, Wyoming.** For: Wyoming Weather, Inc. Prepared for: Water Resources Development Corporation.	May 31, 1951
63	**Analysis of cloud seeding potentialities in Baker Union Counties, Oregon.** For: Agricultural Interests. Prepared for: Water Resources Development Corporation.	May 31, 1951
64	**Analysis of cloud seeding potentialities in Southwestern Nebraska.** For: Southwest Nebraska Weather Improvement Association, Inc. Prepared for: Water Resources Development Corporation.	June 15, 1951
65	**Analysis of cloud seeding potentialities in Southern Utah.** For: Southern Utah Water Resources Development Corporation. Prepared for: Water Resources Development Corporation.	June 15, 1951
66	**Analysis of cloud seeding potentialities to increase natural precipitation in Brule, Buffalo, Gerauld, Aurora Counties, South Dakota.** For: Western South Dakota Rain Increasing Corp. Prepared for: Water Resources Development Corporation.	June 15, 1951

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67	**Analysis of cloud seeding potentialities to increase natural precipitation in the Grand River Valley Area of North and South Dakota.** For: Grand River Valley Weather Improvement Association. Prepared for: Water Resources Development Corporation.	June 30, 1951
68	**Analysis of cloud seeding potentialities to increase natural precipitation in the area of Matamoras, Tam. (Mexico).** For: Comite Regional de Defensa Agricola. Prepared for: Water Resources Development Corporation.	June 30, 1951
69	**Analysis of cloud seeding potentialities to increase natural precipitation in Coastal Bend Area, Texas.** For: Coastal Bend Agricultural Committee. Prepared for: Water Resources Development Corporation.	June 30, 1951
70	**A report on cloud seeding potentialities in Central Cuba.** For: American Sugar Refining Company Cunagua and Jaronu. Prepared for: Water Resources Development Corporation.	March 25, 195
71	**Preliminary report cloud seeding operations, San Luis Valley, Colorado —January 21–April 30, 1951.** For: San Luis Valley Weather Corporation. Prepared for: Water Resources Development Corporation.	May 23, 1951
72	**Report on cloud seeding operations Southeast Arizona, December 26, 1950–April 30, 1951.** For: Southeastern Arizona Water Resources Corp. Prepared for: Water Resources Development Corporation.	June 21, 1951
73	**Report on cloud seeding operations, Antelope Valley, California.** For: Antelope Valley Water Development Corporation.	July 13, 1951
74	**A report on cloud seeding operations in Upper Rio Grande Basin, New Mexico, February–June, 1951.** For: Moisture Production Corporation. Prepared for: Water Resources Development Corporation.	Sept. 28, 1951
75	**Report on cloud seeding operations Southeastern Arizona, December 26, 1950–October 31, 1951.** For: Southeast Arizona Weather Research Corporation. Prepared for: Water Resources Development Corporation.	Nov. 9, 1951
77	**Report on cloud seeding operations—Horse Heaven Area, Washington, September, 1950–June 1951.** For: The Horse Heaven Water Development Corporation. Prepared for: Water Resources Development Corporation.	Sept. 28, 1951
78	**Report on cloud seeding operations, Big Bend Area, Washington, October, 1950–June, 1951.** For: The Big Bend Water Development Corporation. Prepared for: Water Resources Development Corporation.	Sept. 28, 1951
79	**Report on cloud seeding operations for Eastern New Mexico Weather Research Association, March 1–October 31, 1951.** Prepared for: Water Resources Development Corporation.	Nov. 15, 1951
80	**Final report analysis of cloud seeding potentialities to increase runoff in the Columbia River Basin above Grand Coulee (Washington).** For: Bonneville Power Administration.	Sept. 30, 1951
81	**Analysis of cloud seeding potentialities in Southern California.** For: Research.	Oct. 26, 1951
83	**Report on cloud seeding operations—northern Colorado.** For: Northern Colorado Natural Resources Association.	Sept. 7, 1951
85	**Preliminary report, cloud seeding potentialities Southwestern Nebraska.** For: Southwestern Nebraska Weather Improvement Association.	May 21, 1951
86	**Evaluation of cloud seeding by physical and synoptic approaches.** By Newton C. Stone and Lewis O. Grant. Paper presented at 116th National Meeting of American Meteorological Society, Corvallis, Oregon, June 17, 1952, by N. C. Stone.	July 10, 1952
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89	**Analysis of cloud seeding potentialities in the Colorado River Basin of Texas.** For: Lower Colorado River Authority.	Jan. 31, 1952

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101	**Report on cloud seeding operations Northwestern Kansas, April to June and August to October, 1951.** For: The High Plains Water Resources Development Association.	March 7, 1952
103	**Analysis of cloud seeding operations for Tri-County Weather Research, Inc. (Oregon) September, 1950 through June 1951—Final Report.**	1952
104	**Analysis of cloud seeding operations for Southwestern Nebraska Weather Improvement Association, Inc. April 15 thru October 12, 1951—Final Report.**	1952
105	**Analysis of cloud seeding operations.** For: Northwest Nebraska Water Resources Development Corporation, May 15 thru October 12, 1951—Final Report.	1952
106	**Analysis of cloud seeding operations for Border Livestock Association (Texas) March thru July 15, 1951—Final Report.**	1952
107	**Analysis of cloud seeding operations for Coastal Bend Agricultural Improvement Association (Texas) March 13 thru July 15, 1951—Final Report.**	1952
108	**Analysis of cloud seeding operations for Brooks-Jim Hogg Agricultural Development Association (Texas), March 8 thru October 31, 1951—Final Report.**	1952
109	**Analysis of cloud seeding operations for Weather Improvement Corporation (of Montana), May 15 thru September 30, 1951—Final Report.**	1952
110	**Analysis of cloud seeding operations for North Central Washington Water Development Corporation, June 1 thru June 30, 1951.**	1952
111	**Final operation report for Southeast Arizona Weather Research Corporation, January 1–December 30, 1951.**	1952
118	**Final operations report for Northwestern Colorado Weather Improvement Corporation, May 1, 1951–April 30, 1952.**	1952
126	**Final operations report for Western South Dakota Rain Increasing Corporation.**	1952

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128	**Final operations report for West Central South Dakota Weather Improvement Association.**	1952
129	**Final operating report 1952, for Weather Improvement Corporation, (Montana).**	Oct. 16, 1952
130	**Final operating report 1952, for Western South Dakota Rain Increasing Corporation and West Central South Dakota Weather Improvement Association.**	Oct. 16, 1952
131	**Final operating report, 1952 for North Central Weather Modification Corporation of North Dakota.**	Oct. 16, 1952
132	**Final operating report, 1952 for Powder River Weather Research Corporation (Weston County) (Wyoming) and Powder River Weather Research Corporation (Converse and Niobrara Counties) (Wyoming).**	Oct. 16, 1952
133	**Operating report for Southeastern Arizona Weather Research Corporation, 1952.**	Oct. 24, 1952
134	**Operating report, April–September, 1952 for West Texas Weather Improvement District.**	Oct. 24, 1952
135	**Operating report 1952 for Panhandle Weather Improvement Association (Oklahoma-Texas).**	Oct. 30, 1952
136	**Operating report 1952 for Eastern New Mexico Weather Research Association.**	Nov. 5, 1952
137	**Operating report December 1951–September 1952 for San Ysidro Range Improvement Association (New Mexico).**	Nov. 20, 1952
138	**Operating report, April–September, 1952 for T-O Moisture Improvement Association (Oklahoma-Texas).**	Nov. 5, 1952
139	**Operating report for Northeastern Colorado Water Development Association, February 1951–January 1952, April 1952–September 1952**	Dec. 1, 1952
140	**Operating report for Three Rivers Weather Research Corporation April–September 1951 (Montana).**	Dec. 2, 1952
141	**Terminating report October and November, 1952 for San Ysidro Range Improvement Association (New Mexico).**	Jan. 6, 1953
151	**Final operations report for Tri-County Weather Research Inc. (Oregon).]**	1952
152	**Final operations report for Blue Mountain Weather Research Association (Oregon).**	1952
153	**Final operations report for Horse Heaven Water Development Corporation (Washington).**	1952
154	**Final Operations Report for Big Bend Water Development Corporation, (Washington).**	1952
155	**Final operations report for North Central Washington Water Development Corporation.**	1952
156	**Final operations report for Lincoln Water Development Corporation (Washington).**	1952
303	**Washington & Oregon, Individual Storm Studies for June, 1952.** Project covered Big Bend, Blue Mountain, Horse Heaven, Lincoln, North Central Washington and Tri-County.	1952
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	Survey of potential effects of artificial cloud seeding in the Horse Heaven Area. For Horrigan Farms, Prosser, Washington.	April 24, 1950
	Increasing water resources through weather modification. Address given at Annual Meeting of the American Water Works Association, Kansas City, Missouri, May 7, 1952. Published in Journal American Water Works Association. Vol. 44, No. 11, November, 1952.	Nov. 1952

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted.

In this list the preferred form of title entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organizations follows the title. If the title is not distinctive (for instance, Bulletin, Journal, Trudy, Mitteilungen), the entry consists of the issuing body followed by the title.

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Académie des Sciences, Paris, Comptes Rendus.
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American Geophysical Union, Transactions, National Research Council, Washington.
★**American Meteorological Society, Bulletin,** [Boston].
★**Angewandte Meteorologie,** [Potsdam].
★**Annalen der Meteorologie,** Meteorologisches Amt für Nordwestdeutschland, Hamburg.
Annales de Géophysique, Centre National de la Recherche Scientifique, [Paris].
★**Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A** and **Ser. B,** [Vienna].
Australian Journal of Physics, [Melbourne].
Ciel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe.
Geofisica e Meteorologia, Società Italiana di Geofisica, [Genoa].
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★**Időjárás,** Az Országos Meteorológiai és Földmágnességi Intézet [Budapest].
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Journal of Atmospheric and Terrestrial Physics, [London].
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★**Journal of Meteorology,** American Meteorological Society, [Boston].
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★**The Marine Observer,** Air Ministry, Meteorological Office, London.
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★**Revista Meteorologica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
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★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** Amateur Weathermen of America, Philadelphia.
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam.

★ Indicates those periodicals which are primarily meteorological.

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